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Local Limits Development Guidance

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Disclaimer

The Office of Wastewater Management of EPA's Office of Water prepared this guidance document. EPA intends this document as assistance to municipalities that own or operate publicly owned treatment works in developing and implementing their local pretreatment programs.

Section 402(b) of the Clean Water Act authorizes EPA to allow a State to administer its own NPDES permit program on certain conditions. Among these is the requirement that the State program must include adequate authority to ensure that any permit for discharges from a publicly owned treatment works includes a program to ensure that significant sources that introduce pollutants to the POTW which are subject to pretreatment standards promulgated under section 307(b) of the Act comply with such pretreatment standards [Section 402(b)(8), 33 U.S.C. § 1342(b)(8)]. This guidance will assist POTWs in their efforts to meet their requirement to develop pretreatment programs.

The discussion in this document is intended solely as guidance. This guidance is not a regulation itself nor does not it substitute for any requirements under Clean Water Act or EPA's regulations. Thus, it does not impose legally binding requirements on EPA, States, municipalities or the regulated community, and the general descriptions provided here may not apply to a particular situation based upon the circumstances. This guidance does not confer legal rights or impose legal obligations upon any member of the public.

Among other things, in the course of the guidance, the document describes existing requirements with respect to industrial dischargers and publicly owned treatment works under the Clean Water Act and its implementing regulations at 40 CFR 122, 123, 124, 403 and chapter 1, subchapter N. A discharger's legal duty requires it to comply with the CWA and its implementing regulations. While EPA has made every effort to ensure the accuracy of the discussion in this guidance, a discharger's obligations are determined, in the case of directly discharging POTWs, by the terms of their NPDES permit and EPA's regulations or, in the case of indirect dischargers, by permits or equivalent control mechanisms issued to POTW industrial users or by regulatory requirements. Nothing in this guidance, of course, changes any statutory or regulatory requirement. In the event of a conflict between the discussion in this guidance and any permit or regulation, the guidance would not be controlling. EPA and local decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this guidance where appropriate and authorized by EPA regulations, State law or local ordinances. .

Mention of trade names or commercial products does not constitute endorsement or recommendation for their use.

EPA may decide to revise this guidance without public notice to reflect changes in the Agency's approach to implementing pretreatment standards or to clarify and update text.

CONTENTS

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ADRE	Average daily removal efficiency
AHL	Allowable headworks loading
BDL	Below Detection Limits
BOD	Biochemical Oxygen Demand
BOD_5	5-day Biochemical Oxygen Demand
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWF	Combined Wastestream Formula
EPA	United States Environmental Protection Agency
FOG	Fats, oils, and greases
IU	Industrial User
IWS	Industrial Waste Survey
I&I	Inflow and Infiltration
LEL	Lower Explosive Limit
MAHL	Maximum Allowable Headworks Loading
MAIL	Maximum Allowable Industrial Loading
MCL	Maximum Contaminant Level
MDL	Method detection limit

MGD	Million gallons per day
MLE	Maximum likelihood estimation
MRE	Mean removal efficiency
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute for Occupational Safety and Health
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
POC	Pollutant of Concern
POTW	Publicly Owned Treatment Works
PS	Percent solids
RCRA	Resource Conservation and Recovery Act
ROS	Regression order statistic
SA	Site area
SIP	State Implementation Plan
SIU	Significant Industrial User
SL	Site life
SUO	Sewer Use Ordinance
STEL	Short-Term Exposure Limit
TCLP	Toxicity Characteristic Leaching Procedure
TRE	Toxics Reduction Evaluation
TSS	Total suspended solids
TWA-TLV	Time Weighted Average Threshold Limit Value
VOC	Volatile Organic Compound

WET	Whole Effluent Toxicity
WQC	Water Quality Criteria
WQS	Water Quality Standards

GLOSSARY

5-day Biochemical Oxygen Demand (BOD_5). The biochemical oxygen demand of wastewater during decomposition occurring over a 5-day period. A measure of the organic content of wastewater.

Allowable Headworks Loading (AHL). The maximum quantity of a pollutant (the pollutant “loading”) which will not cause a POTW to violate a treatment plant or environmental criterion developed to prevent process inhibition or interference, or to violate effluent, sewage sludge, or air quality standards.

American Conference of Governmental Industrial Hygienists (ACGIH). The American Conference of Governmental Industrial Hygienists is a member-based organization and community of professionals that advances worker health and safety through education and the development and dissemination of scientific and technical knowledge.
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Approval Authority. The Director in an NPDES State with an approved State pretreatment program and the appropriate EPA Regional Administrator in a non-NPDES State or NPDES State without an approved State pretreatment program (40 CFR 403.3).

Clean Water Act (CWA). The primary federal law that protects our nation’s waters, including lakes, rivers, aquifers and coastal areas. It provides for the establishment of a comprehensive program that includes standards, technical tools, and financial assistance to address the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction.

Clean Air Act (CAA). The Federal Clean Air Act is the federal law passed in 1970 and last amended in 1990 which forms the basis for the national air pollution control effort. Basic elements of the act include national ambient air quality standards for major air pollutants, hazardous air pollutants standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

Code of Federal Regulations (CFR). A codification of the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the Federal Government. The CFR is divided into 50 titles, which represent broad areas subject to federal regulation. Each title is divided into chapters, which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas. Large parts may be subdivided into subparts. All parts are organized in sections, and most citations to the CFR are provided at the section level.

Combined Wastestream Formula (CWF). A procedure under EPA’s pretreatment regulations for calculating alternative discharge limits at industrial facilities where a regulated wastestream from a categorical industrial user is combined with other wastestreams prior to treatment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress in 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Control Authority. As defined in 40 CFR 403.12, the POTW if the POTW's submission for its pretreatment program (40 CFR 403.3(t)1)) has been approved in accordance with the requirements of 40 CFR 403.11; or (2) the Approval Authority if the Submission has not been approved.

Conservative Pollutants. Pollutants which are presumed not to be destroyed, biodegraded, chemically transformed, or volatilized within the POTW. Conservative pollutants introduced to a POTW ultimately exit the POTW solely through the POTW's effluent and sludge.

Flashpoint. The lowest temperature at which vapor combustion will propagate away from its source of ignition.

Headworks. The point at which wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, comminutors, a wet well and pumps.

Industrial User (IU). An industrial facility that discharges wastewater into sanitary sewers for treatment by a public owned treatment works.

Industrial Waste Survey (IWS). The process of identifying and locating industrial users and characterizing their industrial discharges.

Inflow and Infiltration (I&I). Infiltration is the seepage of groundwater into a sewer system, including service connections. Seepage frequently occurs through defective or cracked pipes, pipe joints, connections or manhole walls. Inflow is the water discharged into a sewer system and service connections from sources other than regular connections. This includes flow from yard drains, foundation drains and around manhole covers. Inflow differs from infiltration in that it is a direct discharge into the sewer rather than a leak in the sewer itself.

Interference. EPA uses the term "interference" in its regulations to describe a discharge that, alone or with discharges from other sources, inhibits or disrupts a publicly owned treatment works (POTW), its treatment processes and operations, or its sludge processes, use, or disposal and therefore causes a violation of the POTW's NPDES permit, and increases the magnitude or duration of such a violation.

Lower Explosive Limit (LEL). The minimum concentration in air at which a gas or vapor will explode or burn in the presence of an ignition source.

Maximum Contaminant Level (MCL). The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are an enforceable standard.

Maximum Allowable Industrial Loading (MAIL). The total daily mass of a particular pollutant that a POTW can accept from all permitted industrial users and ensure the POTW is protecting against pass through and interference. If required, the MAIL may be calculated by applying a safety factor to the MAHL, and discounting by domestic wastewater loading.

Maximum Allowable Headworks Loading (MAHL). Upper limit of pollutant loading at which a POTW will not violate any treatment plant or environmental criteria developed to prevent process inhibition or interference, or violation of effluent, sludge, or air quality standards.

National Ambient Air Quality Standards (NAAQS). Standards established by EPA that apply for outside air throughout the country.

National Institutes of Occupational Safety and Health (NIOSH). The National Institute for Occupational Safety and Health (NIOSH) is the federal agency responsible for conducting research and making recommendations for the prevention of work-related disease and injury. The Institute is part of the Centers for Disease Control and Prevention (CDC).

National Pollutant Discharge Elimination System (NPDES). The Clean Water Act prohibits the discharge of a pollutant except in compliance with the permitting system established the Act. Thus, the discharge of pollutants into the waters of the United States is prohibited unless a special NPDES permit is issued by EPA, a state, or, where delegated, a Native American tribal government.

Non-Conservative Pollutants. Pollutants which are presumed to be destroyed, biodegraded, chemically transformed, or volatilized within the POTW to some degree.

Occupational Safety and Health Administration (OSHA). The Occupational Health and Safety Administration is part of the U.S. Department of Labor. It was founded in 1971 to save lives, prevent injuries and protect the health of America’s workers.

Pass Through. EPA uses the term “pass through” in its regulations to describe a discharge that enters the waters of the United States from a publicly owned treatment works (POTW) in quantities or concentrations that, alone or with discharges from other sources, either causes a violation of any requirement of the POTW’s NPDES permit, or increases the magnitude or duration of a violation of the POTW’s NPDES permit.

Pollutant of Concern (POC). Any pollutant that might reasonably be expected to be discharged to the POTW in sufficient amounts to pass through or interfere with the works, contaminate its sludge, cause problems in its collection system, or jeopardize its worker’s health and/or safety.

Publicly Owned Treatment Works (POTW). A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designated to treat domestic wastewater.

Resource Conservation and Recovery Act (RCRA). Passed by Congress in 1976, RCRA gave EPA the authority to control hazardous waste from the “cradle-to-grave.” This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA). The Federal Hazardous and Solid Waste Amendments are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

Sewer Use Ordinance (SUO). A legal mechanism implemented by a local government entity which sets out, among others, requirements for the discharge of pollutants into a POTW.

Short-Term Exposure Level (STEL). Concentrations to which a worker should not be exposed for longer than 15 minutes and should not be repeated more than four time per day, with at least one hour between exposures.

Significant Industrial User (SIU). All users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR chapter I, subchapter N; and any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, non-contact cooling and boiler blowdown wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

State Implementation Plan (SIP). An EPA-approved State plan required by the Clean Air Act for the establishment, regulation, and enforcement of air pollution standards.

Time Weighted Average Threshold Limit Value (TWA-TLV). The concentration to which a worker can be exposed for 8 hours per day, 40 hours per week and not have any acute or chronic adverse health effects.

Total Suspended Solids (TSS). A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids."

Toxicity Characteristic Leaching Procedure (TCLP). A laboratory procedure designed to predict whether a particular waste is likely to leach chemicals into groundwater at dangerous levels.

Volatile Organic Compound (VOC). Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Whole Effluent Toxicity (WET) Tests. Whole effluent toxicity is the aggregate toxic effect of an effluent measured directly by an aquatic toxicity test. Aquatic toxicity methods designed specifically for measure WET have been codified in 40 CFR 136. WET test methods employ a suite of standardized freshwater, marine, and estuarine plants, invertebrates, and vertebrates to estimate acute and short-term chronic toxicity of effluents and receiving waters.

CHAPTER 1 - INTRODUCTION

1.1 PURPOSE OF THIS MANUAL

This manual provides guidance to municipalities on the development and implementation of local controls or limits on discharges to publicly owned treatment works (POTWs). Although EPA believes individual industrial users can benefit from this guidance, the primary audience for this manual is the POTW personnel responsible for local pretreatment program implementation. The manual provides practical technical assistance and reasoned guidance on:

- Determining pollutants of concern (POCs)
- Collecting and analyzing data
- Calculating maximum allowable headworks loadings (MAHLs) for each POC
- Designating and implementing local limits
- Performing annual reviews and periodic re-evaluations
- Developing local limits to address concerns about collection systems

Appendix L contains a list of supplemental EPA documents to this manual. If in a State with an approved pretreatment program, POTW personnel should also refer to guidance manuals and spreadsheets available from State Approval Authorities.

1.2 LOCAL LIMITS STATUTORY AUTHORITY

A component of the National Pollutant Discharge Elimination System (NPDES) Program, the National Pretreatment Program was created by the U.S. Environmental Protection Agency (EPA) to control the discharge of pollutants from non-domestic sources to publicly owned treatment works (POTWs). The statutory authority for the National Pretreatment Program lies in the Federal Water Pollution Control Act of 1972, which was amended by Congress in 1977 and renamed the Clean Water Act (CWA). Under section 307(b), EPA must develop Pretreatment Standards that prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with POTWs. The 1977 amendments to the CWA required that permits for discharges from POTWs include a program to ensure compliance with the pretreatment standards by each significant local source introducing pollutants subject to pretreatment standards into a POTW. To meet the requirements of the 1977 amendments, EPA developed the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403).

1.3 LOCAL LIMITS PROCESS

To protect its operations and to ensure that its discharges comply with State and federal requirements, a POTW will design its local limits to take into account site-specific conditions. Among the factors a POTW should consider are the POTW's efficiency in treating wastes; its compliance with its NPDES permit limits; the condition of the water body that receives its treated effluent; any water quality standards that are applicable to the water body receiving its effluent; the POTW's retention, use, and disposal of sewage sludge; and worker health and safety concerns. The General Pretreatment Regulations require that:

- POTWs which are developing pretreatment programs must develop and enforce specific limits on prohibited discharges, or demonstrate that the limits are not necessary [40 CFR 403.8(f)(4)].

- POTWs which have approved pretreatment programs must continue to develop and revise local limits as necessary [40 CFR 403.5(c)(1)].

- POTWs which do not have approved pretreatment programs must develop specific limits if pollutants from non-domestic sources result in interference or pass through and such occurrence is likely to recur [40 CFR 403.5(c)(2)]. Although not usually required to seek Approval Authority approval, these POTWs should apply the local limits development process described in this manual.

EPA and the states have approved more than 1,600 POTW pretreatment programs. Each program must develop, implement, and enforce technically based local limits. Most of the POTWs that require pretreatment programs now have them, so only a few new programs are approved each year. Work on local limits continues, however, because, as indicated above, the POTWs that have approved programs must regularly re-evaluate the adequacy of their local limits.

Re-evaluating technically-based local limits is an important component of the National Pretreatment Program. The characteristics of POTWs and the discharges they receive change over time, so POTWs should routinely re-evaluate their local limits to ensure they continue to provide adequate protection for POTW operation. Re-evaluating local limits in response to changes affecting a POTW may require as much effort as developing them in the first place. Examples of such changes that may trigger the need for such a re-evaluation include a re-issuance of the POTW's NPDES permit that results in a modified NPDES limit, major construction at the POTW, and significant changes in the rate at which the POTW removes a pollutant.

EPA recommends annual reviews of local limits. A useful tool for these reviews is a screening analysis to compare previously calculated MAHLs with current POTW loadings. A review also should address readily apparent concerns, such as NPDES permit violations. Section 122.44(j)(2)(ii) requires that NPDES permits contain a condition to provide a written technical evaluation of the need to revise local limits following permit reissue. If the local limits appear to be insufficient, the POTW should further evaluate the pollutants for which limits should be recalculated or established. As discussed throughout this manual, evaluating these POCs is a key concept throughout the entire local limits process.

1.4 NATIONAL PRETREATMENT STANDARDS

The National Pretreatment Program specifies three types of national pretreatment standards (pollutant discharge limits) that apply to industrial users (IUs). These include general and specific prohibitions on the discharge of certain pollutants, categorical standards limiting discharges by IUs in specific industrial subcategories, and local limits. Every IU is subject to the general and specific prohibitions, even if it is not subject to any other pretreatment requirements.

General prohibitions (40 CFR 403(5)(a)) forbid the discharge to a POTW of any pollutant that causes pass through or interference. Pass-through means a discharge that causes a violation of any requirement of the POTW's NPDES permit. Interference refers to a discharge that inhibits or disrupts the POTW, its treatment process or operations, or its sludge processes and leads to violation of the NPDES permits or any other applicable federal, state, or local regulation.

Specific prohibitions (40 CFR 403.5(b)(1) to (8)) forbid eight categories of pollutant discharges to POTWs.:

- Pollutants that create fire or explosion hazards
- Pollutants that will cause structural damage due to corrosion
- Pollutants that will cause obstructions in the flow of discharges to the POTW
- Pollutants released at excessive rates of flow or concentrations
- Excessive heat
- Certain oils
- Pollutants that result in the presence of toxic gases, vapors, or fumes
- Trucked or hauled pollutants, except at discharge points designated by the POTW

Categorical standards are uniform, technology-based, and applicable nationwide. Developed by EPA, these standards apply to specific categories of IUs and limit the discharge of specified toxic and non-conventional pollutants to POTWs. Expressed as numerical limits and management standards, the categorical standards are found at 40 CFR 405 to 471. They include specific limitations for 32 industrial sectors. Appendix A provides a current list of the industries for which categorical standards have been promulgated. Appendix J contains a list of pollutants regulated by categorical pretreatment standards. Appendix K contains information on the development of effluent limitations and guidelines for industrial categories.

The prohibitions and categorical standards are designed to provide a minimum acceptable level of control over IU discharges. They do not, however, take into account site-specific factors at POTWs that may necessitate additional controls. For example, a POTW that discharges into a river designated a "scenic river" under the Wild and Scenic River Act may have extremely low discharge limits. To comply with its discharge permit, the POTW may need to exert greater control over IU discharges. This additional control can be obtained by establishing local limits.

1.5 THE RELATIONSHIP OF LOCAL LIMITS TO CATEGORICAL STANDARDS

Categorical standards and local limits are complementary types of pretreatment standards.[1] The former are developed to achieve uniform water pollution control nationwide for selected pollutants and industries. The latter are intended to prevent site-specific POTW and environmental problems due to non-domestic discharges. As shown in Table 1-1, local limits can be broader in scope and more diverse in form than categorical standards. The development of local limits requires the assessment of local conditions and the judgment of POTW personnel.

[1] A direct comparison of Categorical Standards and local limits may not be possible because local limits may apply at the point(s) where an IU connects to the POTW collection system, while Categorical Standards apply at the end of the IU's regulated process(es).

Table 1-1. Comparison of Categorical Standards and Local Limits

Characteristic	Categorical Standards	Local Limits
Agency responsible for development	EPA	Control Authority (usually POTW)
Potential sources regulated	Industries specified in Clean Water Act, or as determined by EPA	All non-domestic dischargers
Objective	Uniform national control of non-domestic discharges	Protection of plant and local environment
Pollutants regulated	Primarily Priority Pollutants listed under Clean Water Act section 307 (toxic and non-conventional pollutants only)	Any pollutant that may cause Pass Through or Interference
Basis	Technology based	Technically based on site-specific factors: • Allowable headworks loadings • toxicity reduction evaluation • technology in use • management practice
Point of application	At the end of the regulated process(es) or in-plant	Depends on development methodology [usually at the point of discharge(s) into the collection system]

EPA's promulgation of categorical standards does not relieve a POTW from its obligation to evaluate the need for and to develop local limits to meet the general and specific prohibitions in the General Pretreatment Regulations. Because specific prohibitions and categorical standards provide only general protection against pass through and interference, local limits based on POTW-specific conditions are necessary. Developed in accordance with 40 CFR 403(5)(c), local limits are deemed Pretreatment Standards for the purposes of CWA section 307(d). Therefore, EPA can take enforcement actions against an IU that violates a local limit. Affected third parties also may sue IUs that have approved pretreatment programs for violations of local limits under the CWA's citizen suit provisions. A POTW may impose on an IU local limits that are more stringent, or cover more pollutants, than the applicable Categorical Standard. This may be necessary so the POTW can meet its discharge permit or sludge quality limits. If a local limit is less stringent than an applicable Categorical Standard, however, the industry to which the local limit applies still must meet the applicable Categorical Standard. Additional guidance on the comparison of Categorical Standards and local limits is available in two EPA guidance manuals: *Industrial User Permitting Guidance Manual* (EPA 833-B-89-001, September 1989) and *Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula* (EPA 833-B-85-210, September 1985).

1.6 ORGANIZATION OF THE GUIDANCE MANUAL

This guidance manual provides an organized approach to the development and re-evaluation of local limits. Chapter 2 outlines the general approach for determining when to develop and when to re-evaluate local limits (providing a roadmap through the remainder of the manual). It also provides an overview of the local limits development process using the maximum allowable headworks approach. Chapters 3 to 6 cover limit development and implementation. Chapter 7 discusses the annual review and re-evaluations of local limits, and Chapter 8 describes approaches to local limits development based on collection system concerns. The final chapter, Chapter 9, provides additional information in a question-and-answer format on numerous issues that have arisen in local limits efforts and that may require special consideration during the development and re-evaluation of local limits.

CHAPTER 2 - OVERVIEW OF LOCAL LIMITS DEVELOPMENT

Local limits development is a continual process for Control Authorities (usually POTWs). Technically-based limits are typically developed when a Control Authority/POTW first creates its local pretreatment program. As noted in Chapter 1, a POTW required to develop a pretreatment program also must develop and enforce local limits, as necessary, to protect against pass through and interference. In addition, a Control Authority's legal authority to impose local limits on industrial and commercial users actually derives from State law. Therefore, State law must confer the minimum federal legal authority requirements on a Control Authority. Section 6.7 of Chapter 6 provides a more complete discussion of the need for and application of this authority.

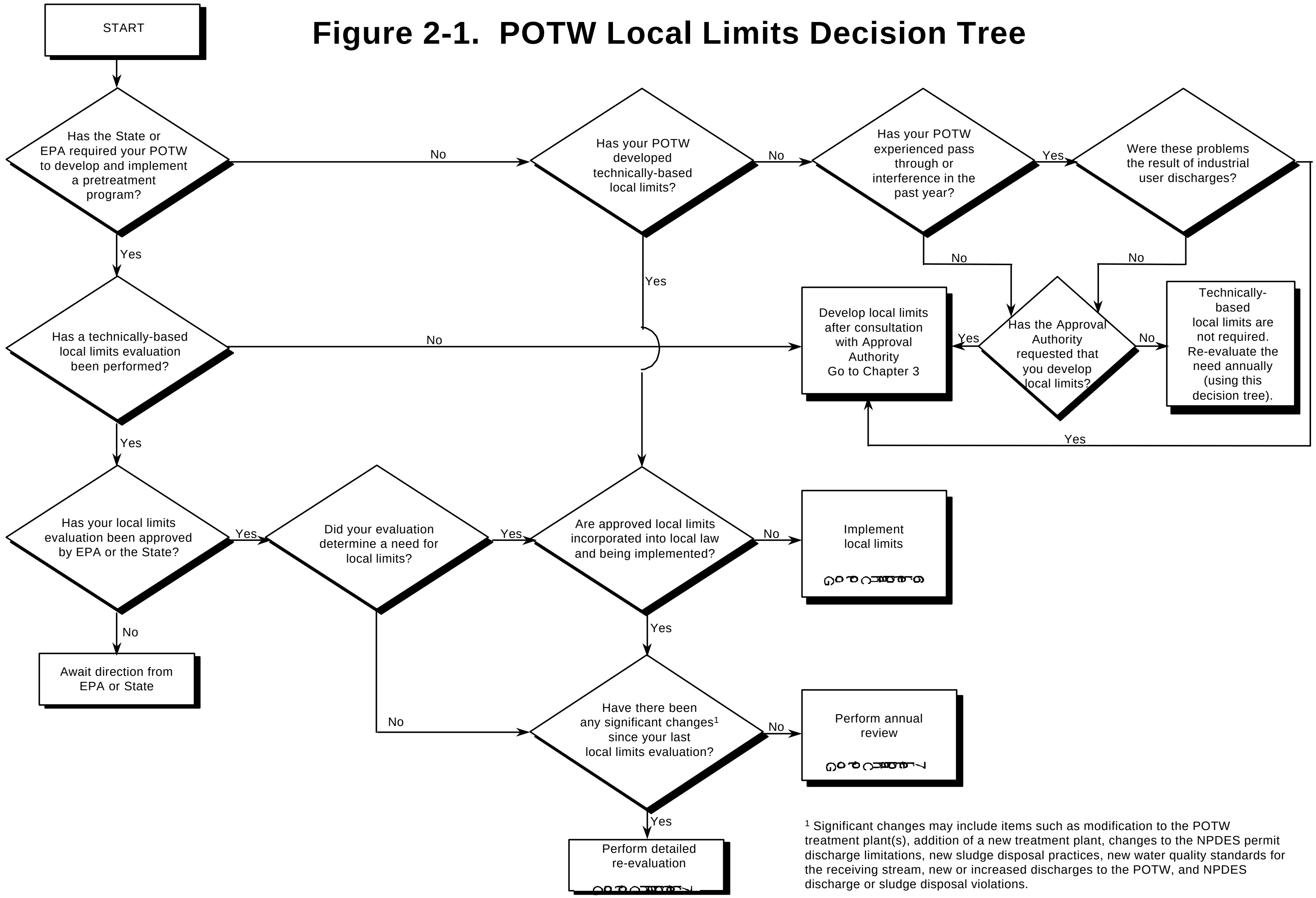
Once local limits have been developed, POTWs should review them periodically and revise them as necessary. Chapter 2 provides an overview of the local limits development process.

2.1 LOCAL LIMITS DECISION TREE

Figure 2-1 presents a decision tree that POTWs can use to determine what local limit implementation procedures are appropriate. POTWs can follow the approach to evaluate their need for new local limits, and the adequacy of existing ones. EPA recommends that POTWs which have approved pretreatment programs review their local limits approximately 3 months before their annual reports are due and discuss the re-evaluation results in their annual reports. All other POTWs also should probably perform this evaluation every year, preferably at about the same time each year. *Following the steps presented in Figure 2-1 will lead readers to the chapters of this manual that are appropriate for their evaluation.*

Whenever possible, local limits should be established to address constituents that could pass through or cause interference *before* such problems occur. While developing a new local limit, or re-evaluating an existing one, a POTW should consider all relevant plant and environmental information—including trends that may indicate likely future conditions. Anticipating changes and setting local limits accordingly may reduce the need for future revisions, saving POTW resources and enhancing IU compliance. For example, a POTW that anticipates changing its sludge disposal practices can develop local limits that will be protective of any more restrictive sludge standards that may apply in the near future. Similarly, if economic growth within the service area is likely, a POTW can apply a safety factor, or hold some maximum allowable headworks loading capacity (MAHL) in reserve so that an allocation will be available in the future. Otherwise, new industrial hook-ups may have to be prohibited, or local limits may have to be revised.

Figure 2-1. POTW Local Limits Decision Tree



[1] Significant changes may include items such as modification to the POTW treatment plant(s), addition of a new treatment plant, changes to the NPDES permit discharge limitations, new sludge disposal practices, new water quality standards for the receiving stream, new or increased discharges to the POTW, and NPDES discharge or sludge disposal violations.

2.2 MAHL Approach to Local Limits Development

EPA recommends that POTWs base their local limits on the maximum allowable headworks loading (MAHL)[2] calculated for each pollutant of concern. A pollutant's MAHL is determined by calculating its allowable headworks loading (AHL) for each environmental criterion; the most stringent AHL is the MAHL (see Exhibit 2-1).

Exhibit 2-1: Example MAHL Determination Based on AHLs

To determine the MAHL for cadmium, a POTW:

- Calculates that so long as the AHL at its headworks does not exceed 14 lbs/day it will meet its NPDES permit limit.
- Calculates that so long as the AHL at its headworks does not exceed 30 lbs./day it will meet its land application requirements for sludge.
- Reviews its records and determines that an AHL at the headworks of 60 lbs./day would protect its operations from toxic inhibition.

Assuming no other criteria apply to this plant, its MAHL for cadmium would be 14 lbs./day (the most limiting criterion).

The MAHL approach enables POTWs to calculate local limits taking into account the portion of the MAHL that is readily controllable (i.e., from industrial users (IUs)) and the portion that is not so easy to control (i.e., from domestic sources and background concentrations). The maximum allowable industrial loading (MAIL) is the portion of the MAHL available to IUs. It is based on sampling data (see Exhibit 2-2). As discussed in Chapter 8, local limits are based on the allocation of MAILs as uniform concentrations that apply to all IUs, as mass allocations provided individually to each IU, or some combination of the two options.

Exhibit 2-2: Example MAIL Determination

To determine the MAIL for cadmium, a POTW collects sampling data and finds that 7 of the 10 lbs. of cadmium received at its treatment plant every day come from domestic/background/commercial (i.e., uncontrollable) sources.

With a MAHL of 14 lbs./day for cadmium—and assuming no other uncontrollable sources exist—the MAIL would be 7 lbs./day (14 lbs./day allowable minus 7 lbs/day from uncontrollable sources).

Calculating MAHLs is not an appropriate way to evaluate the need for local limits to control pollutants that, when present at certain levels, create collection system concerns such as fumes that are harmful to workers. The local limits to address collection system concerns are based on evaluations of the potential for fires, explosions, corrosion, flow obstructions, temperature, and toxic fumes. To address these cases, POTWs should consider the options presented in Chapter 8.

Developing and implementing local limits using the MAHL approach requires four basic steps:

1. Determine the pollutants of concern (POCs)
2. Collect and analyze data
3. Calculate MAHLs for each POC
4. Designate and implement the local limits

[2] A MAHL is the maximum loading of a pollutant that can be received at a POTW's headworks without causing Pass Through and Interference and still protect the receiving stream's water quality and the POTW's sludge use and disposal options.

2.2.1 STEP 1: DETERMINE POCS

The first step in the MAHL approach is to identify the pollutants that should be evaluated to determine the need for local limits to control them. Among these are pollutants for which there are known environmental criteria (such as limits in the POTW's NPDES permit), other pollutants that are known to be discharged to the POTW, and pollutants known to be discharged to POTWs in general. The POTW should collect a limited amount of screening data to determine which of these potential pollutants of concern should be subject to more extensive data collection through the local limits monitoring program. Chapter 3 discusses the procedures POTWs can use to determine POCs.

2.2.2 STEP 2: COLLECT AND ANALYZE DATA

After identifying the POCs that warrant a closer look, the POTW should undertake the collection of the necessary data, including additional sampling and analysis of selected wastewater streams to gauge the potential impacts of these POCs. The recommended procedures for collecting and analyzing data used to calculate MAHLs is provided in Chapter 4.

2.2.3 STEP 3: CALCULATE MAHLS FOR EACH POC

After collecting and evaluating the necessary data, the POTW should calculate AHLs for each POC based on its treatment efficiency and on environmental criteria for pass through and interference. As previously noted, the most stringent AHL will determine the MAHL. Chapter 5 discusses the procedures used by POTWs to calculate MAHLs.

2.2.4 STEP 4: DESIGNATE AND IMPLEMENT LOCAL LIMITS

Having calculated the MAHLs, the POTW needs to compare these allowable loadings with the actual and potential loadings received at the treatment plant to determine whether local limits are needed for each POC. Once the need for them has been established, the POTW should develop appropriate local limits. This process will include determining the amount of each pollutant that can be allocated to IUs, submitting a development package to the Approval Authority for its review and approval, incorporating the local limits into local law (which includes following public notice requirements), and applying the local limits to the IUs. Chapter 6 discusses these implementation procedures in detail.

CHAPTER 3 - DETERMINING POLLUTANTS OF CONCERN

POTWs develop local limits to protect their collection systems, treatment plants, the health and safety of their workers, and the environment. Chapter 3 provides guidance on how to identify which pollutants are of concern and must be controlled to meet these goals and to meet federal, state, and local requirements.

A **pollutant of concern (POC)** is any pollutant that might reasonably be expected to be discharged to the POTW in sufficient amounts to pass through or interfere with the works, contaminate its sludge, cause problems in its collection system, or jeopardize its workers.

3.1 NATIONAL POCS

EPA has identified 15 pollutants often found in POTW sludge and effluent that should be assumed to be POCs. They are listed in Exhibit 3-1. Ten of the pollutants were first identified in the *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (EPA 833-B87-202, December 1987). EPA has added molybdenum and selenium because they are part of the federal biosolids regulations for the land application of sludge. EPA also added the conventional pollutants 5-day Biochemical Oxygen Demand (BOD_5) and total suspended solids (TSS) because many POTWs have ongoing problems with excessive loadings of these pollutants and because they are basic design criteria for wastewater treatment plants. EPA also added ammonia because many POTWs experience toxicity in their effluent from ammonia.

Exhibit 3-1: EPA's 15 POCs

Arsenic	Mercury
Cadmium	Molybdenum
Chromium	Nickel
Copper	Selenium
Cyanide	Silver
Lead	Zinc

5-day Biochemical Oxygen Demand
Total Suspended Solids
Ammonia

EPA recommends that each POTW should, at a minimum, screen for the presence of the 15 pollutants presented in Exhibit 3-1 using data on industrial user (IU) discharges and collected from samples of POTW influent, effluent, and sludge. A POTW should presume that each pollutant is a POC unless agreement can be reached with the Approval Authority that it is not.

3.2 OTHER POTENTIAL POCS

To identify additional potential POCs, a POTW should:

- Determine the environmental standards and other statutory and regulatory requirements that it must meet.
- Define measures necessary to protect the plant, collection system, and workers.
- Identify the pollutants in the POTW influent, effluent, and sludge.

- Characterize industrial user (IU) and other non-domestic discharges to assess which discharges, and which pollutants in those discharges, pose potential problems.

At a minium, a POTW's local limits should be designed to ensure that a POTW will meet the statutory and regulatory requirements of the Clean Water Act, General Pretreatment Regulations, and any applicable state or local requirements. National Pollutant Discharge Elimination System (NPDES) permit conditions, sludge disposal practices, and state and local requirements vary from one POTW to another; they need to be addressed through local limits.

3.2.1 NPDES PERMIT CONDITIONS

The NPDES permit issued to a POTW typically contains:

- Specific effluent limitations on conventional and non-conventional pollutants.
- Water quality-based toxic pollutant limitations.
- Whole effluent toxicity (WET) requirements expressed either as a narrative limitation (e.g., “no toxics in toxic amounts”) or a numerical criterion.
- Criteria and other conditions for sludge use or disposal.
- Removal efficiency requirements (e.g., “85-percent removal of BOD”).
- Requirements that the POTW be well operated and maintained.

These permit conditions, and other applicable requirements, establish the objectives that the POTW must meet to prevent pass through and interference. Because POTWs are required to prohibit discharges from industrial users (IUs) in amounts that result in the violation of water quality-based NPDES permit limits, the POTW must develop local limits to prevent pass through and interference. Furthermore, if pass through or interference is the result of inadequately treated industrial discharges from any user, the POTW must develop local limits for the pollutants responsible for the pass through or interference.

Any pollutant that has caused violations or operational problems at the POTW—including conventional pollutants and phosphorus —should be considered a POC. Any pollutant designated “monitor only” in the NPDES permit also should be designated a POC. Some POTWs will need to develop local limits to reduce aquatic toxicity. If WET testing shows that a POTW's effluent is toxic, the pollutant responsible should be designated a POC. [For more information, see EPA's March 1991 publication, *Technical Support Document for Water Quality-based Toxics Control.*]

NPDES permit limits often are based on specific water quality standards and are generally expressed as numerical limits. WET requirements in POTW permits may be expressed as numerical criteria or as narrative limitations.

3.2.2 WATER QUALITY CRITERIA

Water quality criteria have been developed by EPA for protection of surface water, including receiving water for permitted discharge. States may adopt EPA's criteria, or establish more stringent criteria of their own.[3] A POTW does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion, but it should use the applicable water quality standards or criteria to comply with the narrative limitations on pollutants for which no numerical limits are specified in its NPDES permit. EPA recommends that any pollutant which has a "reasonable potential" to be discharged in amounts that could exceed water quality standards or criteria should be considered a POC and evaluated accordingly.

3.2.3 SLUDGE QUALITY STANDARDS

POTWs must prohibit IU discharges in amounts that cause a violation of applicable sludge disposal or use regulations, or which restrict the POTW's use of its chosen sludge disposal or use option. The national sludge standards are found at 40 CFR Part 503. They are based on human health and environmental risks and comprise numerical pollutant limits, operational standards, management practices, and requirements for monitoring, record keeping, and reporting. The sludge use and disposal options are:

- Land application
- Surface disposal
- Incineration
- Depositing in a municipal solid waste landfill

Exhibit 3-2: Pollutants Regulated Under 40 CFR Part 503

The pollutants that are regulated depend on the type of sludge disposal method used:

- **Land application**: arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, zinc.
- **Surface disposal:** arsenic, chromium, nickel
- **Incineration**: beryllium and mercury (National Emission Standards for Hazardous Air Pollutants under 40 CFR Part 61), lead (National Ambient Air Quality Standard), plus arsenic, cadmium, chromium, nickel (risk-specific concentrations).

To dispose of its sludge by land application, surface disposal, or incineration, a POTW must ensure that its sludge meets the pollutant limits that apply to the selected disposal option. Therefore, any pollutant limited by an applicable sludge disposal standard should be designated a POC. If sewage sludge is disposed of in a municipal solid waste landfill, there are no specific pollutant limitations that apply.

The sludge standards found at 40 CFR 503 are presented in Appendix D. As is true of water quality criteria, States are free to establish their own sludge use and disposal standards, as long as they are more stringent or cover more pollutants than the federal requirements. POTWs should contact their Approval Authorities or other State agencies for a copy of the relevant State standards. They should adhere to the more stringent standards. *EPA recommends that POTWs have as a goal the attainment of "clean sludge" standards, which are delineated in Table 3 of 40 CFR 503.13.* This is consistent with the objectives of the pretreatment program, which are listed at 40 CFR 403.2.

POTWs that normally dispose of their sludge in landfills also may be adversely affected by IU discharges. These POTWs also should develop local limits to ensure their sludge disposal options are not restricted. When slated for disposal in a landfill, sludges and residual ash from the incineration of sludge should be

[3] Federal water quality criteria are listed in Appendix B, but readers should contact their states to determine whether stricter criteria must be met.

tested using the Toxic Characteristic Leaching Procedure (TCLP) discussed in Appendix II of 40 CFR Part 261. Sludge is considered a hazardous waste if it contains pollutants in concentrations that exceed those listed in the TCLP. Hazardous wastes must be disposed of in accordance with the Resource Conservation and Recovery Act (RCRA), which will likely increase disposal costs. The pollutant limits for the TCLP rule are listed in Appendix E.

3.2.4 AIR EMISSION STANDARDS

A POTW may decide to develop local limits to protect air quality, or it may be required to do so to ensure compliance with State or local air quality regulations. Sections 109 and 110 of the Clean Air Act (CAA) require EPA to set National Ambient Air Quality Standards (NAAQS) and require States to develop State Implementation Plans (SIPs), which contain specific regulatory requirements for specific sources to meet NAAQS. The State and local regulations developed to achieve compliance with the NAAQS vary according to the air quality and the type and number of air pollution sources in a region. These regulations may affect POTWs. For example, a city that is having trouble meeting the NAAQS for ozone may require POTWs to develop local limits to reduce air emissions in the collection system and at the headworks that result from IU discharges containing volatile organic compounds (VOCs). POTWs subject to State or local air quality regulations should assess the need for local limits to ensure compliance with applicable requirements. A list of urban air toxics designated for possible National Emission Standards for Hazardous Air Pollutants (NESHAP) limits on POTWs is presented in Appendix F. POTWs should designate as a POC any of these pollutants that have the potential to exceed these standards if discharged from the works or its collection system.

3.2.5 DRINKING WATER AND RESOURCE PROTECTION CRITERIA

POTWs whose receiving waters are designated public or private drinking water supplies should ensure that their discharges do not lead to an exceedence of a maximum contaminant level (MCL) in the drinking water supply. *One way to do this is to establish local limits for pollutants covered by MCLs. Federal primary and secondary MCLs can be found in Appendix G*. States may have more stringent MCLs, or MCLs for contaminants in addition to those listed in Appendix G. Additionally, some States integrate resource protection (water shed and aquifer protection) criteria into local limits. Obviously, EPA would encourage POTWs to protect drinking water and ground water sources through the development of local limits to the extent authorized under State law or local ordinances.

3.2.6 PROHIBITIONS ON TREATMENT PLAN INTERFERENCE

The General Pretreatment Regulations include prohibitions, at 40 CFR 403.5(a), against the discharge by any user of a POTW of pollutants that cause pass through or interference. Under EPA's regulation, pass through occurs whenever a discharge exits a POTW in a quantity or concentration which causes a violation of the POTW's NPDES permit. Interference, as defined by EPA, means a discharge that inhibits or disrupts a POTW and therefore causes violation of the POTW's NPDES permit or non-compliance with the POTW's sewage sludge requirements. Consequently, EPA recommends that a POTW should consider pollutants that may interfere with the treatment work's operation to be potential POCs. And if a POTW has experienced interference in the past, the pollutants that caused the interference should be considered POCs.

Although some pollutant discharges may not cause a POTW to violate its NPDES permit or the sludge disposal regulations, they might disrupt POTW operations, increase operation and maintenance (O&M) costs, and even lead to violations of specific prohibitions. For example, IU discharges that inhibit a POTW's biological treatment system could reduce treatment efficiency and, as a result, increase operating costs. At worst, interference causes NPDES violations and necessitates reseeding and stabilization of the treatment plant. In addition, interference may result in the production of sludge that requires special treatment before disposal, or disposal in a manner not generally used by the POTW. Some pollutants that can cause interference, and the estimated concentrations at which inhibitory effects can occur, are listed in Appendix H.

3.2.7 PROHIBITIONS TO PROTECT THE TREATMENT WORKS, COLLECTION SYSTEM, AND WORKERS

As noted in Chapter 1, the prohibitions in this category apply to discharges of pollutants that can cause a fire or explosion, corrosive structural damage at the treatment plant, obstruction of flow, inhibition of biological activity due to heat, and discharges that cause the formation of toxic gases, vapors, or fumes. A local sewer use ordinance that applies to a POTW typically contains definitions or local limits that implement the specific prohibitions. Definitions may consist of descriptions from 40 CFR 403.5(b), or more specific quantitative definitions (e.g., specific readings on an explosimeter to protect against fire or explosion). Specific quantitative limits generally are more effective for avoiding ambiguity and for supporting IU compliance and POTW enforcement of IU non-compliance. Chapter 10 provides more detail on procedures for identifying POCs based on these concerns and for setting local limits to address these concerns.

Explosive and Flammable Substances

Explosive and flammable pollutants discharged to a POTW can threaten the integrity of the collection system and the health and safety of POTW workers. The accumulation of such pollutants in treatment works can, under the right conditions, produce explosions or fires. Local limits can be used to regulate the discharge of these explosive or flammable pollutants. Lower explosive limits (LELs) and closed cup flashpoints for various organic compounds are provided in Appendices Y and Z.

Fume Toxicity

The fume toxicity level of a pollutant discharged to a POTW indicates the likelihood that a POTW worker will suffer an adverse health effect when the level is approached or exceeded. This level can be measured by the time weighted average threshold limit value (TWA-TLV), which is the concentration to which a worker can be exposed for 8 hours a day, 40 hours per week and not have any acute or chronic adverse health effects. Similarly, short-term exposure limits (STELs) are concentrations to which a worker should not be exposed for longer than 15 minutes and should not be repeated more than four times per day, with at least 1 hour between each exposure. Guidelines on TWA-TLVs and STELs for gases that pose the threat of acute or chronic health effects in people can be found in Appendix I.

VOC vapors are a major concern because they can be toxic and carcinogenic, and may produce acute and chronic health effects for various periods of exposure. Also of concern are the hazards associated with toxic gases produced when certain inorganic discharges mix in the collection system. For example, acidic discharges can combine with nonvolatile substances such as sulfide and cyanide to produce toxic gases and vapors (e.g., hydrogen sulfide and hydrogen cyanide), which are hazardous to people. To respond to this threat, POTWs can establish local limits based on the maximum recommended levels of these POCs in air. A list of pollutants and the NIOSH, OSHA, and ACGIH guidelines and exposure levels also can be found in Appendix I.

3.2.8 SCANS OF POTW INFLUENT, EFFLUENT, AND SLUDGE TO IDENTIFY PRIORITY POLLUTANTS

The results of priority pollutant scans of POTW influent, effluent, and sludge conducted during the previous 12 months can help identify pollutants discharged to the POTW and determine which are potential POCs. Priority pollutants specified under the CWA are listed in Appendix B. EPA recommends that a POTW also should analyze the influent, effluent, and sludge for any other pollutants that might reasonably be expected to be present, based on information about IU discharges gathered by the POTW from previous monitoring and from its industrial waste survey.

A POTW should conduct additional screening for any pollutant found in the scans of its influent, effluent, or sludge to determine whether the pollutant should be listed as a POC. Although a pollutant found in this way is a potential POC, the POTW may determine, based on the pollutant's concentration and on other data from IUs and commercial dischargers, that the pollutant need not be selected as a POC for the full headworks analysis.

3.2.9 Evaluations of Industrial and Commercial Discharges

A POTW cannot make informed decisions about potential problem discharges without a comprehensive understanding of the IU discharges to its collection system. Numerous sources of information about IUs, commercial users, and their discharges are available to POTWs. Collecting and reviewing data from such sources is an important initial step in identifying POCs. Some of the available sources are:

- Industrial waste surveys
- IU permit applications
- The results of IU self-monitoring and POTW compliance monitoring
- The results of POTW inspections of IUs
- Chambers of Commerce and local trade organizations
- General surveillance of the types of facilities in an area
- EPA Development Documents for categorical industries
- EPA Pretreatment Program guidance manuals
- State and regional NPDES permitting authorities
- State pollutant and chemical databases
- The Internet and the World Wide Web

Table 3-1 presents details on some of these potential sources of information.

POTWs should evaluate their IUs and the characteristics of the IUs' discharges to determine which pollutants are likely to be present in the POTW's waste stream. This evaluation is particularly important when an individual IU's discharges make up a large portion of the POTW's total industrial loading, or when POCs are known to be, or suspected of being, discharged in large quantities or concentrations. Monitoring at IU discharge points and at other points in the collection system may detect discharges that could cause problems in the collection system or at the treatment works. Discharges from commercial facilities also should be assessed because some of these facilities (such as hospitals, dentists' offices, and photoprocessors) can be significant sources of pollutant loadings.

Table 3-1: Selected Information Sources for Determining Potential POCs

Source	Information Provided
Industrial waste Survey (IWS)	POTWs can request in the IWS information that may help it identify and assess the pollutants discharged, or potentially discharged, by each user surveyed. The information gained from the IWS can help the POTW: • Identify IUs of which the POTW had been unaware, or that have recently moved into the POTW's service area. • Identify pollutants likely to be discharged to the collection system that should be considered potential POCs. • Identify previously unknown characteristics of an IU and its discharges. • Evaluate the potential for slug loadings and periods of increased loadings from variable discharges (e.g., from facilities that experience seasonal fluctuation in their discharges and from batch dischargers). • Plan a monitoring program to help ensure efficient use of POTW resources. • Estimate raw waste loadings of pollutants for which analytical methods are unavailable. • Identify opportunities for pollution prevention. Most, if not all, POTWs that have approved pretreatment programs will have conducted initial IWSs. POTWs also may find it helpful to review IWS data in conjunction with pollutant occurrence data for various industries.
IU permit applications	Details of the pollutants likely to be discharged by an IU and received at the POTW. Through permits or local ordinances, POTWs can require IUs to provide toxicity data for pollutants detected in the IU's wastewater. IUs generally can get such data from the manufacturers of its raw feedstock, solvents, surfactants, and other chemicals.
IU self-monitoring, POTW compliance monitoring, and inspections	Indications of the pollutants discharged, or potentially discharged, by IUs. Also, confirmation of information provided by the industrial waste survey and IU permit applications.
EPA Development Documents for categorical industries	Summaries of processes used by categorical industries, descriptions of typical treatment technologies for these industries, and a list of priority pollutants generally found in the discharges of categorical industries. Also a list of development documents and information on how to obtain copies.
EPA Pretreatment Program guidance manuals	Lists of priority pollutants likely to be found in discharges from various industries, lists of guidance and other manuals, and information on how to obtain copies of the manuals.
State and regional NPDES permitting authorities	Data on pollutants detected in direct dischargers' effluents, which can be reviewed by POTWs to identify pollutants that may be discharged by similar IUs in their service areas.
State pollutant and chemical databases	Sources of information about industrial effluent*

*For example, the Michigan Department of Natural Resources Critical Materials Register contains information on the toxicity, carcinogenicity, bioconcentration, mutagenicity, and teratogenicity of pollutants. It also contains information on the types of pollutants used or discharged by various industries. Priority pollutants and other pollutants are included in the database, which is based on sampling data and information supplied by industries.

The North Carolina Department of Resources and Community Development has created databases using reports of POTW effluent toxicity and the associated discharges of toxics from IUs, as well as information provided by chemical manufacturers about the chemical characteristics, such as measured toxicity, of biocidal compounds.

3.2.10 HAULED WASTE

When determining POCs, POTWs should consider the pollutants in, and resultant pollutant loadings from, any hauled waste they accept for treatment and disposal.[4] Hauled waste has the potential to cause pass through, interference, sludge contamination, and to endanger POTW personnel. Although it typically consists of domestic sewage, hauled waste tends to be more concentrated than typical domestic wastewater and can contain:

- Industrial and commercial waste
- Grease and sand trap waste
- Chemical toilet waste
- Hazardous waste
- Ground water remediation site waste
- Landfill leachate

An EPA analysis of nine POTWs found that hauled septage may contain relatively high amounts of heavy metals and organic solvents (EPA, 1991).[5]

Many POTWs accept only domestic wastes from waste haulers and will specify this limitation in their sewer use ordinances. If not accepting hauled industrial wastes, however, the POTW should ensure that any potential POCs in these wastes are identified and considered through in the local limits evaluation. Additional information on the acceptance and characterization of hauled wastes at POTWs is available in *Guidance Manual for the Control of Waste Hauled to Publicly Owned Treatment Works* (EPA/833-B98-003). POTWs should periodically monitor hauled wastes to confirm that only appropriate wastes are being brought by waste haulers and to identify any potential POCs which should be addressed by local limits. *Please see Appendix W for landfill leachate loadings.*

3.2.11 REMEDIATION SITE WASTE

Waste from remediation sites, especially ground water remediation sites, may be hauled to POTWs for treatment and disposal. Site operators should provide the receiving POTW with information on waste volume, pollutants present, and pollutant concentrations. POTWs can use such information to identify potential POCs. Remediation wastes from sites being cleaned up under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) may include:

- Landfill leachate
- Contaminated ground water
- Aqueous waste stored in containers

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[4] The General Pretreatment Regulations cover “pollutants from non-domestic sources covered by Pretreatment Standards which are indirectly discharged into or transported by truck or rail or otherwise introduced into POTWs” [40 CFR 403.1(b)]. This means that any hauled waste from industries subject to categorical pretreatment standards should comply with the standards before being accepted for treatment at the POTW. A POTW that has implemented a federally required pretreatment program should have adequate legal authority to regulate its receipt of all non-domestic waste, including non-domestic hauled waste.

[5] The monitoring data provided to the nine POTWs by septage haulers are summarized in Appendix M.

- Wastes from tanks and surface impoundments
- Treatment sludges
- Runoff from contaminated soils

Wastes from CERCLA sites commonly contain trichloroethylene, lead, toluene, benzene, polychlorinated biphenyls (PCBs), chloroform, tetrachloroethylene, phenol, arsenic, and cadmium. Although many CERCLA wastes are quite dilute, some sites have reported high concentrations of metals and organics (e.g., chromium at 1,758 mg/L, bis(2-chloroethyl) ether at 210 mg/L, and chloroform at 200 mg/L). POTWs considering whether to accept CERCLA clean-up wastes should require detailed analyses and treatability testing before making any decisions. Data from these activities can be used to determine the presence of POCs. Additional guidance on CERCLA wastes is available from *CERCLA Site Discharges to POTWs Guidance Manual* (EPA 542/6-90-005).

3.2.12 HAZARDOUS WASTES

Wastes identified as hazardous under RCRA[6] can be legally introduced to a POTW by being discharged into the collection system through an IU's normal sewer connection, or by being transported to the POTW by truck, rail, or dedicated pipeline. A POTW that accepts hazardous wastes may need considerable resources to comply with CWA and RCRA requirements.

When mixed with domestic sewage in a POTW's collection system before reaching the boundary of the treatment works' property, RCRA hazardous wastes are excluded from regulation under RCRA by the Domestic Sewage Exclusion (DSE). (They are, however, subject to the CWA and should meet all applicable categorical and local discharge limits.) As part of their implementation of the industrial pretreatment program, municipal officials should ensure that IUs control and properly manage their hazardous waste. The POTW should determine which pollutants are being discharged and should evaluate whether the pollutants ought to be considered POCs.

A POTW may receive hazardous wastes directly by truck, rail, or dedicated pipeline only if the POTW is complying with the RCRA permit-by-rule requirements for treatment, storage, and disposal facilities found at 40 CFR 270.60. The responsibility and liability of POTWs accepting hazardous wastes in this manner are explained in EPA's 1987 document *Guidance Manual for the Identification of Hazardous Wastes Delivered to POTWs by Truck, Rail, or Dedicated Pipeline.*

3.3 SCREENING PROCESS TO SELECT POLLUTANTS FOR LOCAL LIMITS MONITORING PROGRAM AND LIMIT DEVELOPMENT

Before undertaking the extensive collection and analysis of sampling data for the development of local limits discussed in the next chapter, a POTW should conduct a screening to determine which potential POCs should be included in the full headworks analysis. Although the screening process can reduce the

[6] Hazardous wastes are wastes listed as hazardous at 40 CFR 261.31-33, or wastes that exceed specified levels of ignitability, corrosivity, reactivity, or toxicity as defined at 40 CFR 261.21-24. RCRA also lists hazardous constituents, chemicals of concerns in listed waste in 40 CFR 261 Appendix VIII. These constituents are reproduced in Appendix C of the manual.

number of potential POCs subject to the POTW's more extensive local limits monitoring program, the POTW should perform a headworks analysis for:

- EPA's 15 POCs (see Exhibit 3-1),
- POCs identified in the preceding sections of this chapter, and
- Any pollutant for which the POTW has a pre-existing local limit, has a NPDES limit, has an applicable sludge disposal or other environmental standard (e.g., air), or has caused inhibition or other problems in the past.

EPA recommends that the POTW should conduct screening evaluations for all of the potential POCs it has identified. By first undertaking a limited amount of sampling, the POTW may be able to reduce significantly its set of POCs before expending resources on extensive local limits monitoring. Screening sampling should include a minimum of one or two influent, effluent, and sludge samples for each potential POC. The POTW should analyze the data collected from these samples, along with historical data collected during at least the previous 2 years or from priority pollutant scans, to determine which pollutants should be considered POCs for the local limits monitoring program and headworks analysis. In general, if any of the following criteria are met, the potential POC should be subject to local limits monitoring:

- The maximum pollutant concentration in the POTW effluent is more than one-half the allowable effluent concentration required to meet water quality criteria/standards.
- The maximum pollutant concentration in the sludge is more than one-half the applicable sludge criteria guidelines.
- The maximum pollutant concentration in a POTW influent grab sample is more than half the inhibition threshold.
- The maximum pollutant concentration in a POTW influent 24-hour composite sample is one-fourth the inhibition threshold.
- The maximum pollutant concentration in a POTW influent is more than on one five hundredth (1/500) of the applicable sludge use criteria.
- The concentration in the plant influent, adjusted through simple dilution analysis, exceeds water quality criteria/standards.

Some regional EPA offices have guidelines that POTWs can use in determining POCs, and POTWs should contact their EPA regional offices or Approval Authority for details. The methods used to determine pollutants present at levels of concern should be conservative to account for daily fluctuations in POTW pollutant loadings and for the fact that decisions often are based on limited data. After completing its screening, a POTW should implement its local limits monitoring program and conduct a headworks analysis for each remaining POC on its list.

3.4 CONCLUSIONS

After reviewing Chapter 3, POTWs should now be able to determine pollutants of concern. As explained above, among the considerations for determining that a particular pollutant should be further evaluated are:

- They are on EPA's list of 15 pollutants that a POTW should assume to be of concern, unless shown otherwise.

- They are limited by a permit or applicable environmental criteria.

- They have important implications for the protection of the treatment works, collection system, or the health and safety of POTW workers.

A POTW should also have the ability to screen out certain POCs, before expending resources on extensive local limits monitoring discussed in Chapter 4.

CHAPTER 4 - DATA NEEDED TO DEVELOP LOCAL LIMITS

Developing maximum allowable headworks loadings (MAHLs), maximum allowable industrial loadings (MAILs), and local limits requires various types of data. Some of the data comes from dischargers to the POTW, some comes from the operation of the POTW itself, and some comes from characterizations of the conditions in the POTW's receiving water. Data such as flows can be measured directly, but other data are acquired by taking samples from the POTW's wastestream and analyzing them to determine which pollutants are present.

Accurate and defensible local limits cannot be developed without the collection of site-specific data on pollutant loadings at the POTW and on the POTW's removal of those pollutants. Collecting those data requires a systematic effort. Chapter 4 discusses the types of data that are required and the methods to obtain them.

POTWs already conduct some monitoring because the large majority of NPDES permits require that POTW effluent be monitored for constituents such as BOD, fecal coliform bacteria, TSS, residual chlorine, and pH. In addition, many POTW NPDES permits place limits on nitrogen, phosphorus, and trace metals. This monitoring is unlikely to provide all of the data needed for a meaningful local limits calculation, so POTWs that have approved pretreatment programs should routinely sample at other sites within the treatment works, both for local limits development and to remain up to date on their loadings of each pollutant.

The sampling and analysis that support the determination of MAHLs and MAILs are used to:

- Identify or confirm the presence of individual pollutants
- Determine POCs
- Determine current POTW pollutant loadings
- Calculate pollutant-removal efficiencies
- Determine site-specific inhibition thresholds
- Estimate loadings from IU, domestic, and other sources

The sampling and flow data needed to calculate local limits are:

- Pollutant concentration data from POTW influent, POTW effluent, POTW primary effluent, POTW sludge, collection system, receiving stream, industrial users, non-industrial users, and sludge samples.

- Flow data such as total POTW flow, POTW sludge flow to the digester, POTW sludge flow to disposal, industrial flows, receiving stream, hauled waste, and certain commercial users.

If the POTW conducts influent, effluent, and sludge monitoring as part of its pretreatment program, the data can and should be collected so that they can be used in subsequent local limits reviews and headworks analysis.

4.1 SAMPLING LOCATIONS

POTWs should establish monitoring locations within the treatment works and the collection system. EPA provides guidance below on required and suggested sampling locations.

4.1.1 SAMPLING LOCATIONS IN THE POTW

Most of the samples in support of local limits development will be taken inside the POTW to determine its ability to remove pollutants and to quantify the amount of pollutants in its sludge. Therefore, at a minimum, EPA recommends that a POTW establish one point to sample its influent, one point to sample its effluent, and one point to sample its sludge:

- **POTW influent.** EPA recommends that samples be taken at the POTW's headworks to determine the average and maximum levels at which POCs enter the treatment plant. Influent sampling provides data to be used in calculating POTW-specific removal efficiencies and in establishing the level at which the plant is loaded relative to the MAHL, once it is determined. The sample should be drawn from a location that permits the collection of raw wastewater before it is mixed with any wastestreams returned to the headworks from operations within the POTW.

- **POTW effluent.** Sampling the treatment works' effluent is essential for determining the POTW's overall removal efficiency. Samples taken to demonstrate compliance with the POTW's NPDES permit can also be used for this purpose. The sampling location used for NPDES compliance can also be used to draw samples for POCs that do not have NPDES permit limits or NPDES monitoring requirements.

- **POTW sludge.** EPA's sludge disposal regulations require that sludge be sampled at the time of its disposal and after addition of conditioners to determine the percentage of solids it contains. POTWs that use land application for sludge disposal also should sample periodically for other pollutants; the frequency of sampling depends on the amount of sludge generated annually. Sludge samples taken to support compliance with the sludge disposal regulations found at 40 CFR 503 can also be used to calculate local limits.

Other Suggested Sites. A POTW that digests its sludge, either aerobically or anaerobically, should sample the digester contents to determine the levels of pollutants, primarily metals, that are known to cause digester upset. As discussed in the next chapter, one of the requirements of a local limit is to guard against plant upset, including digester inhibition. Little information on digester inhibition is available in the literature, however, and site-specific inhibition is difficult to measure. Consequently, site-specific information will provide acclimation values that can be compared to literature values when analyzing for digester inhibition. In addition, POTWs concerned with inhibition of biological treatment processes in secondary or tertiary treatment should take secondary and tertiary treatment influent samples, respectively.

4.1.2 SAMPLING LOCATIONS IN THE COLLECTION SYSTEM

Knowing the relative contributions of domestic and commercial sources to POTW background loadings is important for converting MAHLs to MAILs. Wastestreams from residential and commercial sources are assumed to contain lower pollutant concentrations than wastestreams from IUs. The pretreatment regulations do not regulate domestic sources. POTWs may choose not to monitor commercial sources, either because of the lower concentrations or because there are too many sources for regulation to be practical.

A recommended way to measure pollutant loadings from these uncontrollable sources is to draw samples from a point within the collection system that isolates residential and commercial sources. EPA recommends that POTWs designate sampling locations within their collection systems based on such considerations as:

- The size of the service area or collection system.

- The variability of pollutant concentrations and loadings from one sector of the collection system to another. (For example, newer areas of a collection system will have higher concentrations of copper, while older areas will have higher concentrations of zinc.)

- Types of commercial establishments represented.

- Whether more than one drinking water system operates within the POTW's service area. (Different water systems may have different water sources, or may add different chemicals to control corrosion.)

Under most circumstances, a POTW whose service area is small should establish at least two sampling points within its collection system. More sampling locations should be established in areas likely to have different pollutant concentrations based on the factors cited above. POTWs should remember that the lower their loadings from uncontrollable sources, the greater flexibility they will have in determining how much of a given pollutant will be available for IUs through the MAIL. Consequently, sampling should be more extensive in areas of the collection system where uncontrollable loadings appear to consume all of the calculated MAHLs.

Although characterizing residential and commercial loadings separately may appear to be useful, the loadings can be combined to determine the loadings from the aggregate of unregulated sources, particularly if cost is a consideration. Only if a POTW intends to regulate commercial sources separately would background levels need to be determined for both residential and commercial sources.

4.2 GUIDANCE ON SAMPLING AT THE HEADWORKS AND IUS

Provided below is some additional guidance on sampling headworks and IUs.

4.2.1 HEADWORKS

The results of headworks sampling can serve as a check on the sampling points selected by the POTW to determine residential and commercial background loads. If the POTW's headworks levels are consistently lower than the levels from the residential and commercial source sampling points, then the latter sampling points do not accurately represent the background levels, or an inordinate amount of inflow and infiltration (I&I) is present at the plant headworks.

When determining residential and commercial background loadings, POTWs should take care not to sample during or after periods of heavy rainfall when I&I is also high. Not only will flows to the POTW be diluted, but sampling wastewaters that contain significant amounts of I&I is inconsistent with the purpose of NPDES permit limits, namely the protection of receiving waters during periods of low flow. I&I sometimes contributes to pollutant loadings—for example, in areas where mining once went on and heavy rains wash pollutants from slag piles into collection systems. Such instances and should be dealt with case by case and pollutant by pollutant through the POTW's Approval Authority.

4.2.2 INDUSTRIAL USERS

Sampling at IUs is helpful if a POTW wants to set local limits based on IU need through one of the various allocation methods available to the treatment works. In order to use one of these methods, the POTW should know the mass of each POC discharged by each IU so it can rank the users by size and, therefore, by need. For these cases, flows should be measured at, and samples taken from, each IU. These data should already be available from the POTW's compliance monitoring and the IUs' self-monitoring programs. Therefore, if the POTW has already collected such data, there probably is no need to make a special effort during local limits development.

Concentration and mass loading data from each IU also can be used to assess the impact a MAIL will have on the POTW's industrial base. This assessment can help the POTW determine what form the local limit should take through an allocation method. Moreover, knowing each facility's level of discharge tells the POTW which facilities will have difficulty meeting any new limits.

4.3 POLLUTANTS FOR WHICH POTWS SHOULD SAMPLE

In general, a POTW should sample for all the pollutants to be included in the calculation of MAHLs and the development of local limits, including:

- The 15 national POCs
  - Arsenic
  - Cadmium
  - Chromium
  - Copper
  - Cyanide
  - Lead
  - Mercury
  - Molybdenum
  - Nickel
  - Selenium
  - Silver
  - Zinc
  - 5-day Biochemical Oxygen Demand
  - Total Suspended Solids

- S Ammonia

- Any POTW-specific POCs
- CWA organic priority pollutants
- TCLP pollutants (if the POTW disposes, or is likely to dispose, of its sludge in landfills)
- Percentage of solids in sludge.

The POTW should sample periodically for the CWA and TCLP pollutants as part of its effort to identify POCs, so additional sampling to support the development of MAHLs may not be necessary. Samples to be analyzed for CWA priority pollutants need to be taken only at the POTW's headworks. Because the limits for BOD and TSS are based on plant capacities (as discussed in the next chapter), sampling for these conventional pollutants also is necessary only at the POTW headworks.

4.4 SUGGESTED SAMPLING ACTIVITIES

Despite the minimum sampling frequencies later presented in Tables 4-1 and 4-2, POTWs should consider using the following method to determine the required number of samples whenever the loading of a pollutant at the headworks begins to approach the MAHL determined for that pollutant. As the loading approaches the MAHL, precision becomes more important and the POTW needs to be more confident that none of its MAHLs is being exceeded.

Local limits sampling should attempt to depict the POTW under typical operating conditions. Therefore, the sampling program should not bias the results by using sampling procedures that ignore the day-to-day and seasonal variability which the POTW expects to encounter. To ensure that sampling data are representative of the variety of conditions, the POTW should consider the following points when setting its sampling schedule:

- Sampling should be conducted randomly and should be representative of the different days, months, and conditions throughout the year. If a POTW establishes a rigid sampling schedule (for example, the first Wednesday of each month), it may bias the local limits development process.

- If infrequent, yet routine, activities are conducted within the POTW, its collection system, or at its IUs, the sampling schedule established by the POTW should collect data representative of these events. Such activities should be represented in the sampling at approximately the frequency at which they occur. Sampling documentation should note if any activity of this type occurred during the sampling period.

- Ideally, POTW sampling should account for hydraulic retention times. If unlagged historical data show wastestream loadings do not vary by more than 10 percent and POTW removal efficiencies remain relatively constant, delayed sampling based on hydraulic detention time may not be critical.

- The sampling schedule should ensure the collection of samples that are representative of the weather conditions that affect POTW operations (i.e., wet weather; hot or cold ambient temperatures).

4.5. SAMPLING FREQUENCIES

To increase confidence in the calculations based on the results of sampling, the POTW also would need to specify the frequency with which they are to be collected in order to ensure an adequate number of samples are collected. Listed below are some suggested sampling frequencies.

4.5.1 SAMPLING FREQUENCIES FOR INITIAL PROGRAM DEVELOPMENT

Samples to support the initial development of local limits should be collected quickly to provide the data necessary to identify POCs, determine MAHLs, calculate MAILs, and implement local limits. Although such sampling frequently occurs during a short period, the sampling program should account for the day-to-day variability at a POTW and for all the pollutants known or suspected to be present in the POTW's influent. When developing local limits, POTWs whose design flows are less than 50 MGD should sample for at least 7 consecutive days, while POTWs whose design flows are greater should sample for 10 to 14 days over a period of 2 weeks to 2 months. Table 4-1 presents the sampling frequencies for influent, effluent, and sludge, as well as suggested sampling frequencies for residential and commercial dischargers.

Table 4-1: Minimum Recommended Sampling Days for Initial Local Limits Development

Parameter	POTW			Residential/ Commercial
	Influent	Effluen t	Sludge	
Organic Priority Pollutants (1)	1 - 2	1 - 2	1	
National POCs	7 - 14	7 - 14	2	7
POTW-specific POCs	7 - 14	7 - 14	2	7
Percent solids, sludge			2	
TCLP pollutants (2)			1	

(1) Conducted once or twice to determine potential POCs.
(2) Sample for TCLP pollutants if sludge is disposed, or likely to be disposed, of in a landfill.

The limited number of sampling events may not generate enough data to calculate the POTW's efficiency at removing every pollutant in its influent. In such cases, some Approval Authorities may allow—or even require—the use of literature values if they believe a POTW's sampling is less accurate than those values.

4.5.2 SAMPLING FREQUENCIES FOR ONGOING EVALUATION

Local limits usually are scrutinized during their initial development, at annual reviews, NPDES permit renewals, and when detailed evaluations are conducted. Frequently conducted over very different time periods, these reviews often have very different data requirements. The initial development of local limits, for example, may require relatively rapid data collection and analysis to meet the schedule for developing a Pretreatment Program submission, of which local limits evaluation is a part. In contrast, annual reviews and detailed evaluations should be based on data collected as part of a routine, long-term monitoring effort.

Ideally, a POTW would sample frequently enough to obtain analytical results that achieve a 95-percent confidence level. This frequency is a function of data variability and usually required about 30 samples per pollutant during the course of the study. Because the statistical methods require many samples, the POTW should plan to conduct routine sampling, rather than wait until it determines its local limits should be re-evaluated. *(Please see Appendix O.)* A program of continual sampling will not only help ensure that sufficient data are available, it also will help the POTW spread out the costs of sampling. If cost becomes a constraint, EPA recommends that sampling to calculate removal rates focus on removal throughout the treatment works and that literature values be used for intermediate process removal rates.

If a POTW's Approval Authority determines that statistically based sampling frequencies are not feasible, the sampling frequencies presented in Table 4-2, based on POTW flow, should be used. This will, however, reduce the data set's confidence interval.

The importance of sampling POTW influent should not be overlooked. Not only is this sampling essential for calculating POTW removal efficiency, it also enables the POTW to calculate the headworks loading of each pollutant and compare it to the MAHL, thus indicating the degree to which the treatment works is

Table 4-2: Minimum Recommended Sampling Frequencies for Ongoing Local Limits Analysis and Evaluation

Parameter	Location	<50 MGD	>50 MGD
Pollutants for which local limits were adopted	Influent, effluent	Once every 3 months	Once every 2 months
Pollutants for which MAHLs were calculated, but for which no local limits were adopted	Influent, effluent	Once every 6 months	Once every 3 months
Organic Priority Pollutants	Influent	Once per year	Once every 6 months
TCLP Pollutants (1), sludge	Sludge	Once per year	Once per year
Sludge percent solids and specific gravity (2)	Sludge	Once every 3 months	Once every 2 months

(1) Conducted if sludge is (or is likely to be) disposed of in a landfill.
(2) The sludge regulations at 40 CFR Part 503 already require the percentage of solids to be determined every day that sludge is applied to land.

loaded. The data from headworks sampling also are used to determine when a local limit must be adopted.

When sampling, a POTW should attempt to account for hydraulic detention times in the works, where possible, by lagging the effluent samples. However, because the detention time for sludge will likely be greater than the period when local limits monitoring occurs, and because of the nature of the sludge sampling procedure itself (see section 4.6), neither more frequent sludge sampling nor lagging samples for sludge detention times is warranted.

4.6 Sampling Methods

The purpose of any sampling is to accurately typify the contents of the wastestream being sampled. Samples of wastewater typically are one of three types: flow-proportioned composites, time composites, or grab samples. Each type has its use in the local limits development process, but the 24-hour, flow-proportioned composite samples are the most accurate for this purpose. This sampling technique should be used whenever feasible for all pollutants except those that require grab samples.

A **flow-proportioned sample**, sometimes called a flow-weighted sample, is one in which, generally a set aliquot of the wastestream is taken after the passage of a set amount of wastewater. Samples are commonly taken by an automatic sampler connected to a device that measures flow. For example, a 500-ml sample may be taken from the wastestream every time 1,000 gallons has been discharged. The sample volumes and flow intervals are usually determined by the capacity of the sampler and the expected total flow of the source.

Time composite samples consist of equal-volume aliquots taken at regular intervals throughout the sampling period. Because the volume of discharge can vary between the times aliquots are drawn, time composite samples are not considered as accurate as flow-proportioned samples. However, the accuracy of the time composite samples approaches that of the flow-proportioned samples as the wastestream's flow rate becomes increasingly uniform. Time composite samples can be used to accurately profile pollutants for local limits development, but the statistical variability of their data will be greater than that of flow-proportioned samples. Consequently, more time composite samples will have to be taken to support a given confidence interval. EPA generally recommends using flow-proportioned samples instead of time composite samples.

Grab samples are individual aliquots collected at intervals of at least 15 minutes without regard to flow rate. They normally are taken manually, rather than by automatic equipment. During the local limits development process, grab samples should be avoided for most pollutants, except the following:

- pH
- Cyanide
- VOCs
- Total phenols
- Oil and grease
- Total petroleum hydrocarbons
- Sulfides
- Flashpoint
- Temperature

When grab samples are required, at least 4 should be collected, although more than 12 grab samples are desirable. If enough grab samples are taken over the sampling period, they may be combined to create a grab composite sample. The aliquots must be collected in separate containers, preserved appropriately, and either composited manually at the laboratory to create a single sample for analysis, or analyzed separately and the results averaged into a single value. If the interval wastestream flow between each grab sample is known, a flow-proportioned grab composite sample may be prepared (see Table 4-3). As an alternative, the grab samples may be analyzed separately and the results averaged according to flow weight (see Table 4-4). Samples to be analyzed for oil and grease or for pH should not be manually composited, however, and the results for pH should not be averaged.

Table 4-3: How to Prepare a Flow Proportional Grab Composite Sample

Sample	Sample Collection/Meter Read Date and Time	Meter Reading (MG)	Interval Flow (IF) Volume (MG)	Flow-proportioned Composite (IF/TF * 1000 ml)
	08/16/99 @ 01:12	6,306.5	-	
1	08/16/99 @ 06:00	6,307.5	1.0	128 mL
2	08/16/99 @ 10:48	6,309.2	1.7	218 mL
3	08/16/99 @ 15:36	6,312.0	2.8	359 mL
4	08/16/99 @ 20:34	6,313.5	1.5	192 mL
5	08/17/99 @ 01:12	6,314.3	0.8	103 mL
		Total Flow (TF)	7.8	

Note: This example assumes that a 1-liter (1,000-mL) composite sample is prepared. If a different composite volume is used, calculate the flow-proportioned composite (the individual grab sample volume to be included in the grab composite) using that volume.

Table 4-4: Example of a Flow-proportioned Average Based on Grab Sample Results and Flow Intervals

Sample	Sample Collection Date and Time	Total Cyanide (TC) (µg/L)	Interval Flow (IF) Volume (MG)	Flow-Proportioned Average (IF/TF * TC)
1	08/16/99 @ 06:00	49	1.0	6 µg/L
2	08/16/99 @ 10:48	120	1.7	26 µg/L
3	08/16/99 @ 15:36	110	2.8	39 µg/L
4	08/16/99 @ 20:34	97	1.5	19 µg/L
5	08/17/99 @ 01:12	20	0.8	2 µg/L
		Average: 79	Total Flow (TF): 7.8	Flow-weighted Average: 93 µg/L

Acquiring a representative **sludge sample** requires that a grab composite sample be taken of the sludge mass. To do that, a POTW should use the sampling technique specified for demonstrating compliance with the sludge regulations found at 40 CFR 503. Specifically, several aliquots are taken from randomly selected locations within the sludge mass and the aliquots are composited to form a single sample for analysis. As with other types of composite sampling, the more aliquots taken, the more accurate the determination of pollutant levels. Additional discussion of this sampling method can be found in *Environmental Regulations and Technology: Control of Pathogens and Vector Attraction in Sewage*

Sludge, 1999 Edition (EPA/625-R-92-013), *POTW Sludge Sampling and Analysis Guidance Document* (EPA/833-B-89-100), and *A Plain English Guide to the EPA Part 503 Biosolids Rule* (EPA/832-R-93-003).

4.7 ANALYTICAL METHODS

The NPDES and the pretreatment regulations require that all wastewater samples be analyzed for the presence of pollutants using the approved methods found at 40 CFR Part 136. These analytical methods also should be used in the development of local limits. When sampling sludge for metals and total solids, however, the requirements in the sludge regulations at 40 CFR Part 503 still apply.[7]

A principal reason for using the Part 136 methods is to allow the comparison of local limits and categorical limits to determine which are more stringent, as required by the General Pretreatment Regulations. However, a POTW may encounter a POC that is not regulated by the categorical standards or for which no sampling and analytical techniques are listed in Part 136. In such cases, the POTW should adopt the local limit as the numerical value and as the sampling and analytical technique used for measurement. Prior approval, however, must be obtained from the Approval Authority through the provisions of the General Pretreatment Regulations at 40 CFR 403.12(g)(4).

To ensure that samples are analyzed properly, a POTW should consider these factors:

- Anticipated pollutant concentration
- Potential interferences
- Total vs. a fraction thereof (e.g., total vs. dissolved metals, or total vs. amenable cyanide)
- The detection level of the analytical method and the detection level necessary to determine removal efficiencies and detect the presence of pollutants in trace amounts.

When selecting methods, POTWs likely will balance these considerations with the cost of the analyses. However, costs should not influence the selection of methods to the extent that necessary detectable levels are not achieved. A data set that has a significant number of non-detectable results will provide only very limited information for use in local limits development, and may compromise the validity of the local limits. If that were to occur, the reduced costs would actually be a waste of money. POTWs should use approved methods with the lowest detection levels to ensure the local limits calculation is robust and defensible. Table 4-5 presents the detection levels for common analytical methods used for various metals.

[7] The analysis of sludge for the presence of metals should be performed according to EPA test method SW-846 and for total solids according to Part 2540 G of the *Standard Methods for the Examination of Water and Wastewater, 18th Edition.*

If some of the analytical results are reported as below detection level (BDL), it may be due to the POTW's sampling techniques or the analytical methods that were selected. Given the need to accurately detect trace levels of pollutants, POTWs should thoroughly examine potential sources of gross and trace contamination,

Table 4-5: MDLs (µg/L) for EPA Wastewater Analytical Methods

Metal (Total)	Flame/ other	Furnace	ICP	1631	1632	1637	1638	1639	1640
Arsenic	2*	1	8		0.003				
Cadmium	5	0.1	1			0.0075	0.013	0.023	0.0024
Chromium	50	1	4						
Copper	20	1	3				0.087		0.024
Cyanide	10**								
Lead	100	1	10			0.036	0.015		0.0081
Mercury	0.2†			0.0002					
Molybdenum	100	1	4						
Nickel	40	1	5				0.33	0.65	0.029
Selenium	2	2	20				0.45	0.83	
Silver	10	0.2	2				0.029		
Zinc	5	0.05	2				0.14	0.14	

* Gaseous Hydride Method
† Cold vapor technique
**Weak Acid Dissociable (WAD) EPA Method 335.1
ICP - Inductively Coupled Plasma
Flame/Other = Flame Atomic Absorption unless otherwise indicated
GFAA - Graphite Furnace Atomic Absorption

then select analytical methods that can detect very low levels of pollutants. *(Please see Appendix AA on Minimizing Contamination.)* EPA has established performance-based sampling and analysis methods (the 1600 series) to measure 13 toxic metals in the low parts-per-thousand to parts-per-billion range. Although these methods were developed for ambient water quality monitoring, POTWs can apply some of the concepts in Method 1669, "*Sampling Ambient Water for Determination of Metals at EPA Water Quality Criteria Levels*," to improve the reliability of the data collected, potentially even using analytical methods 1631, 1632, and 1636-1640. POTWs should check with their Approval Authority before adopting the 1600 series methods for wastewater analysis.

4.8 Information Collection and Maintenance

To document that sampling was conducted properly, POTWs should use field measurement records and chain-of-custody records. The latter are used to identify the person(s) who collected a sample and the persons who may have handled the sample before it was received by the laboratory. They also may be used for inter-laboratory transfers of samples. Chain-of-custody records often contain such information as the type of sample collected, the date(s) and time(s) of the collection, any chemical preservatives added, type of sample container used (i.e., glass, amber glass, or polyethylene), and sample temperature (if the sample was maintained at 4 degrees Celsius). These records also may include the weather conditions and ambient temperature when the sample was taken, the color and odor of the sample, etc.

Laboratory reports not only give POTWs data to use in developing local limits, they also provide data to verify that the holding times were met and the appropriate analytical methods were used. In addition to the analytical results, reports should contain the unique sample ID assigned by the laboratory, the date and time of the sample's preparation and analysis, the preparation and analytical methods used, the identify of the analysts, and quality control data if problems were encountered (including an explanation of the problems and how they were addressed). The POTW should maintain these records for as long as the data they contain are used to support the local limits developed by the treatment works.

4.9 REVIEW AND EVALUATION OF ANALYTICAL RESULTS

To develop sound, technically-based local limits, the POTW should review and evaluate the data collected to ensure they are accurate, reliable, and representative. Only data that meet the POTW's quality assurance/quality control (QA/QC) should be used to support the development of local limits. The EPA guidance document, *Procuring Analytical Services: Guidance for Industrial Pretreatment Programs*, October, 1998 [EPA 833/B-98-004] provides pretreatment authorities and IUs with guidance for procuring analytical services necessary to support CWA programs. *(The document is available on the Internet at http://cfpub1.epa.gov/npdes/)*

A POTW's evaluation of the sampling data may reveal improperly collected data, elevated detection limits, and new POCs. Improperly collected data may mean a sample was taken from the wrong location, was collected as a grab sample instead of a composite, or was improperly handled (i.e., the wrong container was used or the required chemical preservative was not added). The POTW's response usually involves instructing the responsible personnel in what is required, while also collecting additional samples to replace the rejected data.

If an elevated number of non-detects is reported, the POTW should first investigate the cause. If laboratory error is responsible, the POTW may merely re-advise the laboratory about what is required and take additional samples to supplement the reported non-detect data. If interference at the POTW is the cause, the treatment works may choose to identify its cause and either ensure that the sample is prepared in order to minimize or overcome the interference, or select a different analytical method. Elevated non-detects also may reflect a poor choice of analytical methods. If that is the case, the POTW may decide to investigate other analytical methods and select a more appropriate one.

New POCs may be identified by a POTW's sampling of influent, sludge, controlled or uncontrolled sources, a Toxics Reduction Evaluation (TRE), or a change in applicable standards. A vigilant POTW may be able to quickly identify changes in loadings and add the new POCs to its ongoing regimen of evaluation sampling. New POCs identified as a result of a TRE or a change in standards may require multiple samples collected over a short period of time, in addition to being added to the POTW's ongoing sampling program.

4.10 FLOW DATA

To calculate MAHLs, and later, MAILS, data about the flow of various wastestreams will need to be collected so that mass quantities can be computed. The flows for which data are needed are described in the following sections.

4.10.1 Total POTW Flow

It is routine for POTWs to measure the total flow into the treatment works. The measurement of total flow encompasses all sources: industrial, domestic, commercial, and I&I. Any hauled wastes treated by the POTW also may be measured at the headworks, depending on where the hauled wastes are introduced to the treatment system.

The POTW design flow should never be used to calculate local limits because the purpose of a local limit is to protect the treatment works and the environment under existing conditions. If the design flow were used when the actual influent flow is significantly less, a mass limit would exaggerate the domestic and background loadings of pollutants to the POTW and possibly restrict unnecessarily the pollutant load given to IUs.

4.10.2 Sludge Flow to the Digester

Primary and secondary sludge sent to an aerobic or anaerobic digester will contain sorbed pollutants whose mass a POTW will want to determine. Consequently, the average daily flow rate (in millions of gallons per day) of all sludge flows to digestion will need to be known.

4.10.3 Sludge Flow to Disposal

Because one of the most significant environmental impacts that IU discharges can have is on sludge quality, and hence its reuse as a resource, the mass of pollutants in the sludge applied to the surface of the land or disposed of in landfills will need to be known. Most POTWs do not dispose of sludge every day because weather conditions, among other factors, interfere with scheduling. To simplify the calculations, the flow of sludge to disposal should be reported as an average over the entire year. This value is calculated by dividing the total volume of sludge disposed of (measured in millions of gallons) by 365 to yield the average volume of sludge disposed in millions of gallons per day.

4.10.4 Flows from IUs

Converting MAHLs to MAILs requires knowing the flows from all IUs, or more specifically, from the sources that the POTW intends to regulate with numerical local limits. This value is commonly determined by compiling flow data from water use records, IU inspections, and periodic reporting from SIUs. The formulas presented later in this guidance manual use these flows to calculate the mass of pollutants that can be allocated to this group. If the uniform concentration method of distribution is used, it is vital that the flows from all facilities be regulated are incorporated in the total flow from all of the IUs. The formulas treat all other sources of flow as being uncontrollable in nature and contributing to the background loadings.

Some commercial establishments may discharge pollutants in quantities that can be regulated. A photofinisher that discharges to a POTW which is critically loaded with silver is one example. In this case, the photofinisher would be considered a controllable source for silver, but uncontrollable for all other POCs. Consequently, the photofinisher’s flow should be contained in the sum of all flows from IUs when determining the MAIL for silver.

All IUs that discharge a particular pollutant commonly are treated as potential sources of all other pollutants, but this is usually done only for the sake of simplicity. This assumption can be overridden through allocation techniques once MAILs have been calculated. As an alternative, the total industrial flow can be varied for each pollutant based on the facilities that are known sources of those pollutants. This is most commonly done for POTWs that have significant numbers of toxic and conventional sources.

POTWs usually use the sum of all IUs' total plant wastewater flow to develop local limits. Thus, the local limits apply "at the curb," where the flow leaves an IU's property. This may pose some problems for categorical industries, however, because categorical standards always apply at the end of the regulated process. Each POTW will need to carefully examine flow data from its IUs to assure that all process wastewater is being measured. Analysis results and flow data used to evaluate compliance with categorical pretreatment standards may not include all process wastewater from the industry. Categorical standards are applied at the end of the regulated processes, ideally, after pretreatment. Other wastestreams not subject to categorical standards, but subject to local limits, may be discharged downstream of the categorically regulated process wastewater flow. Therefore, there may be more than one sampling location established within a categorical industry to evaluate compliance with local limits and categorical pretreatment standards. Flow and pollutant concentration data that represent total process wastewater from an IU should be used. This may require that the developer of local limits become more familiar with all sampling points, sewer outfalls, and the wastewater characteristics at each IU, especially CIUs. (Detailed discussions on how to establish effluent limits for categorical industries that cannot segregate regulated wastestreams from non-regulated or dilute wastestreams are provided in the *Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula* (EPA 833-B-85-201, September 1985).

All flow from each IU must be evaluated and accounted for as either a "controllable" wastewater flow that will eventually be given a POC pollutant allocation or as an "uncontrolled" wastewater flow that is allowed to have background concentrations of pollutants that are of typical "domestic" concentrations. When an IU’s flow is included in the "uncontrolled" wastewater flow, it must be assigned a pollutant load for each POC. The assigned load cannot be zero because this will contribute significant errors in the local limits evaluation, especially as the size of the IUs uncontrolled domestic/background flow increases.

Hauled wastes also can be a significant source of pollutant loadings, and if they are, they should be controlled through local limits. Therefore, the average daily volumes of hauled wastes accepted by the POTW should be included in the measurement of total industrial flows. It should be noted, however, that while hauled wastes commonly contain high concentrations of pollutants, the wastes generally are low in mass. So, for a POTW to properly determine the additional loading contributed by hauled wastes, the POTW will need extensive sampling of the wastes. Mass loadings can then be calculated and factored into the local limits calculations.

4.11 CONCLUSION

After reviewing Chapter 4, POTWs should be able to support the determination of MAHLs through the collection of various types of data. This information requires an understanding of sampling locations and frequencies, analytical methods, QA/QC, information collection and maintenance procedures, types of pollutants to be sampled, and result review and evaluation. Chapter 5 describes how to use this information to develop MAHLs.

CHAPTER 5 - CALCULATION OF MAXIMUM ALLOWABLE HEADWORKS LOADINGS

By now, the POTW should have determined pollutants of concerns (Chapter 3) and analyzed and collected sufficient data to develop local limits (Chapter 4). This chapter presents the methodology for calculating maximum allowable headworks loadings (MAHLs)—the third step in the four-step MAHL approach to determining local limits. Later, the POTW will evaluate the need for local limits calculate and allocate the maximum allowable industrial loadings (MAILs), and develop final local limits (Chapter 6).

A **MAHL** is the upper limit of pollutant loading at which a POTW will not violate **any** treatment plant or environmental criteria developed to prevent process inhibition or interference, or violation of effluent, sludge, or air quality standards. MAHLs are the basis for local limits. As shown in Figure 5-1, MAHLs are calculated in three steps:

- Calculate POTW removal efficiencies for each POC
- Calculate allowable headworks loadings (AHLs) for each environmental criterion
- Designate as the MAHL the most stringent AHL for each POC

States have an integral role in the development of MAHLs. In addition to state environmental criteria that are the basis of many AHL calculations, some states require that the MAHL calculation be performed on state-specified spreadsheet models. The spreadsheet models ensure consistency in the collection and analysis of data and ease the AHL calculation by providing the pertinent state standards.

5.1 CALCULATION OF REMOVAL EFFICIENCIES

Removal efficiency is the fraction or percent of the influent pollutant loading which is removed from the wastestream across an entire wastewater treatment works, or specific waste water treatment unit within the works. Removal efficiency values for each POC are fundamental inputs to MAHL calculations. Removal efficiency methodologies vary by degree of data quality and calculation method. This section will:

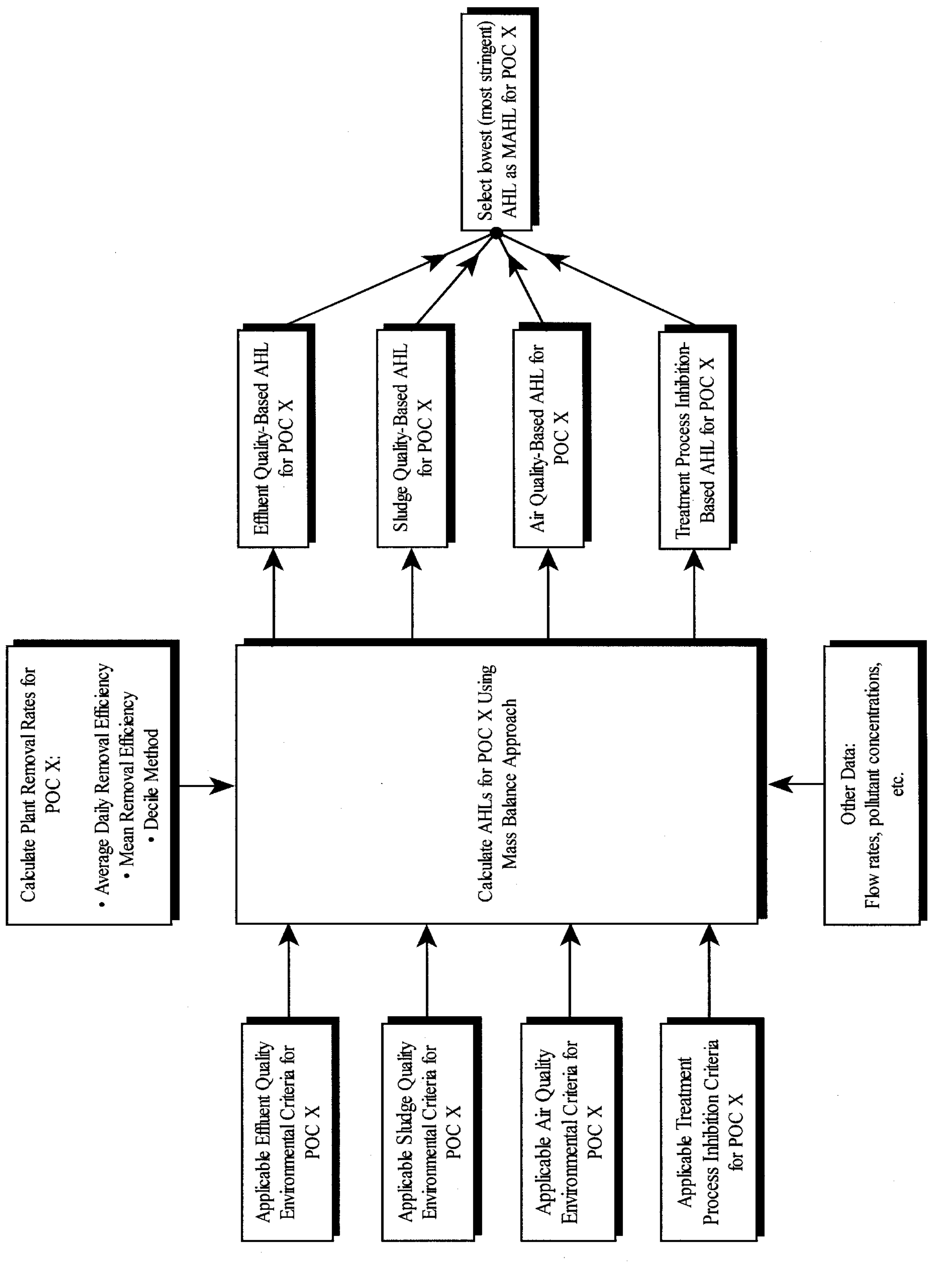
- Explain three different types of removal efficiency calculations methodologies: average removal efficiency, mean removal efficiency, and the decile method.

- Suggest when to use certain methodologies.

- Offer guidance on data quality.

- Discuss applying removal efficiencies reported by other POTWs or industry surveys.

Figure 5-1: Process Flow Diagram for Calculating MAHL for POC X



5.1.1 REMOVAL EFFICIENCY CALCULATION METHODOLOGIES

This section explains the three removal efficiency calculation methodologies commonly used by POTWs. They are the average daily removal efficiency, the mean removal efficiency, and the decile method.

Equation 5.1: Removal Efficiency Calculated Using Average Daily Removal Efficiency (ADRE)

$$R_{wwtp} = \frac{\sum (I_n - E_{wwtp,n})/I_n}{N}$$

$$R_{sec} = \frac{\sum (I_n - I_{sec,n})/I_n}{N}$$

$$R_{ter} = \frac{\sum (I_n - I_{ter,n})/I_n}{N}$$

Where:

R_{wwtp} =	Plant removal efficiency from headworks to plant effluent (as decimal)
R_{sec} =	Removal efficiency from headworks to secondary treatment influent (as decimal)
R_{ter} =	Removal efficiency from headworks to secondary treatment effluent (as decimal)
I_n=	WWTP influent pollutant concentration at headworks , mg/L
$E_{wwtp,\,n}$ =	WWTP effluent pollutant concentration
$I_{sec,\,n}$ =	secondary treatment influent pollutant concentration, mg/L
$I_{ter,n}$ =	tertiary treatment influent pollutant concentration, mg/L
n =	paired observations, numbered 1 to N

Average Daily Removal Efficiency

The **average daily removal efficiency (ADRE)** calculation relies on the premise that an influent sample paired with a lagged effluent sample accurately reflects removal efficiency. Under steady state conditions, the best way to determine the removal efficiency is to sample the influent and effluent on the same day and assume that the difference between the two values is the amount normally removed. However, accuracy is theoretically increased if the influent and effluent samples are lagged by the hydraulic residence time of wastewater within the treatment plant. As shown in Equation 5.1, a series of daily removal efficiencies based on paired headworks influent, I_n, and WWTP effluent data, $E_{wwtp,\,n}$, is calculated first. This series of removal efficiencies is then summed (symbolized in the equation by the Greek letter ∑) and divided by the total number of paired observations, N, to yield the removal efficiency across the entire wastewater treatment plant (from headworks to plant effluent), R_{wwtp}. To calculate the removal efficiency from headworks to secondary treatment influent, R_{sec}, use paired headworks influent, I_n, and secondary treatment influent data, $I_{sec,\,n}$. To calculate the removal efficiency from headworks to tertiary treatment influent, R_{ter}, use paired headworks influent, I_n, and primary treatment effluent data, $I_{ter,\,n}$.

Mean Removal Efficiency

In addition, POTWs may have historical data only for the effluent, or historical data of influent and effluent samples that were not lagged for detention time when sampling. In these cases, the **mean removal efficiency (MRE)** calculation is employed. As shown in Equation 5.2, instead of averaging observed paired removal efficiencies, the MRE calculation *first* averages (symbolized in the equation by the overbars) all plant influent values, I_r, and all plant effluent values, $E_{wwtp,t}$, separately and then calculates removal efficiency across the entire wastewater treatment plant (from headworks to plant effluent), R_{wwtp}. The MRE calculation first averages all headworks influent, I_r, and all secondary treatment influent data, $I_{sec,\,x}$, to calculate the removal efficiency from headworks to secondary treatment influent, R_{sec}. The MRE calculation first averages all headworks influent, I_r, and all tertiary treatment influent data, $I_{ter,y}$, to calculate the removal efficiency from headworks to tertiary treatment influent, R_{ter},

Equation 5.2: Removal Efficiency Calculated Using Mean Removal Efficiency (MRE)

$$R_{wwtp} = \frac{\overline{I_r} - \overline{E_{wwtp,t}}}{\overline{I_r}}$$

$$R_{ter} = \frac{\overline{I_r} - \overline{I_{ter,y}}}{\overline{I_r}} \qquad R_{sec} = \frac{\overline{I_r} - \overline{I_{sec,x}}}{\overline{I_r}}$$

Where:

R_{wwtp} =	Plant removal efficiency from headworks to plant effluent (as decimal)
R_{sec} =	Removal efficiency from headworks to secondary treatment influent (as decimal)
R_{ter} =	Removal efficiency from headworks to tertiary treatment influent (as decimal)
I_r=	WWTP influent pollutant concentration at headworks, mg/L
$E_{wwtp,\,t}$ =	WWTP effluent pollutant concentration, mg/L
$I_{sec,\,t}$ =	secondary treatment influent pollutant concentration, mg/L
$I_{ter,\,t}$ =	tertiary treatment influent pollutant concentration, mg/L
t =	plant effluent samples, numbered 1 to T
r =	plant influent samples, numbered 1 to R
x =	secondary influent samples, numbered 1 to X
y =	tertiary influent samples, numbered 1 to Y

However, the unpaired historical data used in the MRE calculation also has drawbacks because significant changes in the POTW’s industrial base, such as the opening or closing of an industry or the installation of significantly more efficient pretreatment equipment units or source control, can introduce bias into the calculation. Current levels of POTW influent should be compared to historical levels to determine if they are of the same general magnitude.

Decile Method

Mean removal efficiency does not indicate how often the derived removal efficiency was achieved. The **decile method** requires at least nine daily removal efficiency values based on paired sets of influent and effluent data. However, instead of averaging the daily removal efficiency values, the decile method sorts daily removal efficiency data from highest to lowest and calculates the percentage of the daily removal efficiency above or below a specified removal efficiency. The methodology is similar to a data set median. A median divides an ordered data set into two equal parts: half the data set is above the median, and the other half is below. The decile method is similar except it divides the ordered data set into 10 equal parts. Therefore, 10 percent of the data set is below the first decile, 20 percent of the data set is below the second decile, etc. The fifth decile is equivalent to the data set median. The results of an applied decile method approach are shown in Figure 5-2.

Figure 5-2: Decile Results for Hypothetical POTW

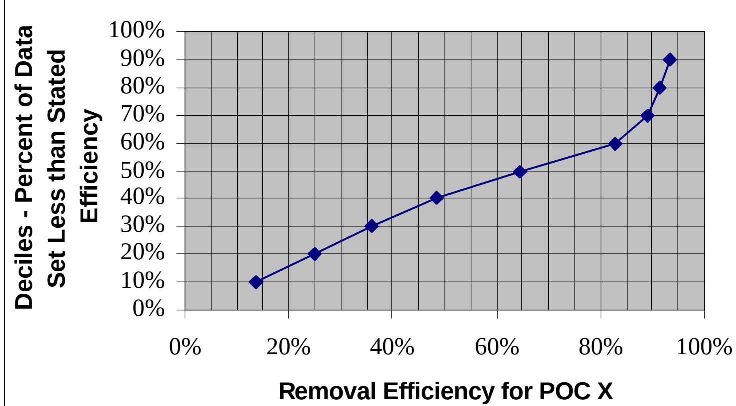


Figure 5-2 shows the decile values (labeled “Deciles - Percent of Data Set Less than Stated Efficiency”) on the Y-axis and the corresponding removal efficiencies for pollutant X on the X-axis. From this figure, a POTW can gain an understanding of the likelihood of certain removal efficiencies. As illustrated at the fifth decile or median, this hypothetical POTW has an overall plant removal efficiency, R_{wwtp}, of 64.5 percent less than half of the time. As illustrated in the third decile, the POTW achieves a pollutant X removal efficiency of below 36 percent less than 30 percent of the time. If concerned about recurring effluent limitation violations due to plant operation variation, the POTW may decide, based on historical knowledge, to use the more conservative third decile, instead of the median fifth decile, as the removal efficiency. However, POTWs should be aware that a lower removal efficiency will lead to a lower, more protective, effluent-based local limits but higher, less protective, sludge-based local limits. *Appendix R of this manual includes sample calculations of removal efficiencies using ADRE, MRE, and decile methods.*

Conservative Pollutant Removal Efficiency Derived from Sludge Data

For conservative pollutants, such as metals, the portion removed during WWTP processes ends up in the sludge (see Figure 5-3). Therefore, for conservative pollutants, POTWs can also use sludge data to estimate removal efficiency across the entire plant, R_{wwtp}. Sludge data should be used in place of effluent data when a POTW has influent data above detection but does not have adequate effluent data above detection, or believes sludge data provide more representative removal efficiencies. As shown in Equations 5.3 and 5.4, ADRE and MRE can be used to calculate removal efficiency across the entire plant, R_{wwtp}, by comparing the sludge and headworks pollutant loading (lbs/day). Sludge loading is calculated by multiplying the sludge concentration, S, by the sludge flow rate, Q_{sldg}, specific gravity, G_{sldg}, and percentage solids, PS. Influent pollutant loading is calculated by multiplying the influent concentration, I, by the WWTP flow rate, Q_{wwtp}. I, the influent pollutant concentration, should be a monthly average in order to be compared with sludge pollutant concentration, which accounts for pollutants that have accumulated for 20 to 30 days. Since most POTWs will not have monthly average influent pollutant concentrations, the MRE method is often the more suitable technique when using this method.

Equation 5.3: Plant Removal Efficiency Calculated Using ADRE and Sludge Data

$$R_{wwtp} = \frac{(S_n * PS/100 * Q_{sldg} * G_{sldg})/(I_n * Q_{wwtp})}{N}$$

Equation 5.4: Plant Removal Efficiency Calculated Using MRE and Sludge Data

$$R_{wwtp} = \frac{\overline{(S_u * 8.34 * PS/100 * Q_{sldg} * G_{sldg})}}{\overline{(I_r * 8.34 * Q_{wwtp})}}$$

Where:

R_{wwtp} =	Plant removal efficiency from headworks to plant effluent (as decimal)
I_n, I_r=	WWTP influent pollutant concentration at headworks, mg/L
PS =	Percent solids of sludge to disposal,
Q_{sldg} =	Total sludge flow to disposal, MGD
Q_{wwtp} =	WWTP flow, average, MGD
G_{sldg} =	Specific gravity of sludge (kg/L)
8.34 =	unit conversion factor
S_n, S_u =	Sludge pollutant concentration, mg/kg
n =	paired observations, numbered 1 to N
u =	sludge samples, numbered 1 to U
r =	influent samples numbered 1 to R

5.1.2 Guidance on Using Different Methodologies

EPA offers the following guidance on implementing the three different methodologies:

- EPA recommends the MRE over the ADRE method because it is generally less sensitive to extreme daily removal efficiencies.

- Although requiring more data, the decile approach allows for a more comprehensive view of the ADRE and MRE because it provides an entire frequency distribution and allows for explicit incorporation of daily removal efficiency variation.

- Although an overall depiction of the POTW removal efficiency frequency is gained in the decile method, an individual decile estimate, depending on how conservative the POTW wants to be in establishing removal efficiencies, can be less precise than the MRE and ADRE estimates.

Appendix R of this manual provides additional guidance in the form of an example and an examination of the different methodologies applied to one data set.

5.1.3 DATA QUALITY

This section reviews some issues related to data quality, quantity, and detection limits that often cause problems during local limits calculations.

Concentrations Below Detection Limit

A POTW's monitoring program will probably yield some sampling results that indicate a pollutant was below the method detection limit (MDL), or "non-detectable," in the analyzed sample. The manner in which the POTW uses these data in local limits development process can significantly affect the MAHLs calculation. Table 5-1 details the different options available to POTW users.

Table 5-1: Options for Managing Sampling Results Below the Method Detection Level ("non-detects") in Removal Efficiency Calculations

If only a few data values are non-detects:	If most data values are non-detects:
Option 1: Use the surrogate method (detailed below).	Option 1: Re-evaluate the need for a local limit for the pollutant. (However, if the pollutant is one of the 15 EPA POCs an AHL should be developed.),
Option 2: Discard the few non-detects. (Influent and effluent data should be discarded in pairs.)	Option 2: Use data from other plants. (Please see section below.)
Option 3: Use a spiked sample technique to obtain actual values. A laboratory introduces a known quantity into the sample and analyzes the sample. The known quantity is then subtracted from the analysis results to obtain a value for the non-detect.	Option 3: Use a spiked sample technique to obtain actual values. A laboratory introduces a known quantity into the sample and analyzes the sample. The known quantity is then subtracted from the analysis results to obtain a value for the non-detect.

The surrogate method simply replaces the non-detect value with another value, such as:

- Zero: assumes the pollutant level which is always lower than the actual value.
- The detection limit: assumes the pollutant level is always higher than the actual value.
- One-half the detection limit: assumes a compromise between these two extremes.

In general, the surrogate method results in a greater bias when calculating the mean or standard deviation. In addition, the surrogate method's relative performance worsens as the proportion of non-detects increases

(Gilliom and Helsel, 1986). Other statistical methods—Regression order statistic (ROS), probability plotting (MR), and maximum likelihood estimations (MLE)—are detailed in Appendix P. The MR method provides slightly more accurate results when non-detects represent 30 percent or more of the data set (Newman et al., 1989). The MLE method works well when the data distribution is exactly normal or lognormal (Harter and Moore, 1966) and when non-detects are less than 30 percent of the data set (Newman et al., 1989).

Negative Removal Efficiency

Negative removal efficiencies are attributable to the fact that POTWs do not operate in a steady state. Deviations from steady state occur because of variability in POTW influent, recycle streams and performance, accumulation of pollutants in POTW sludge, and incidental generation of pollutants by POTW operations. However, negative removal efficiencies should not be summarily dismissed as outliers to normal POTW operation. Reflecting valuable operating data, such as temporary operational problems, negative daily removal efficiencies (DREs) (or for the MRE method, influent and effluent values that would calculate as negative DREs) should be retained in the data set unless there is adequate technical justification (bad sampling or analytical technique, etc.) to remove them. Non-detect readings that can lead to negative removal efficiencies should examined as detailed above. Appendix R provides sample calculations that address negative removal efficiencies.

5.1.4 Applying Removal Efficiencies Reported by Other POTWs or Industry Surveys

Removal efficiencies are based largely on site-specific conditions such as climate, POTW operation and maintenance, plant conditions, and sewage characteristics. Therefore, EPA recommends that site-specific data be used to calculate removal efficiencies. However, some POTWs still do not have adequate site-specific data to calculate removals after conducting site-specific sampling and using analytical methods that achieve the lowest detection levels possible. In these instances, POTWs can selectively use removal efficiencies reported by other POTWs or by studies that have been published in professional journals or by EPA. *Appendix Q provides a listing of removal efficiency data for priority pollutants gathered from other POTWs.*

5.2 Calculation of Allowable Headworks Loadings

An **AHL** is the maximum pollutant loading corresponding to the individual environmental criterion for which it was developed. An AHL is calculated for each applicable criterion: pass through, sludge contamination, air quality standards, and the various forms of interference (biological treatment inhibition, sludge digestion inhibition). The AHLs for each POC are calculated based on the various suitable environmental criteria, plant flow rates, and plant removal efficiency. After calculating a series of AHLs for each POC, the lowest AHL is chosen as the MAHL. Local limits development uses a mass-balance approach to determine the AHLs for a POTW based on the environmental and treatment plant criteria. With the mass-balance approach, the POTW calculates the amount of loading received at the POTW headworks that will still meet the environmental or treatment plant criteria that apply to each pollutant. Steady-state equations are used for conservative pollutants because the amount of pollutant loading is "conserved" throughout the treatment plant, unlike non-conservative pollutants, portions of which are "lost" through volatilization or degradation. Conservative pollutants are removed through sludge adsorption alone, while non-conservative pollutants may be removed through degradation or volatilization in addition to sludge adsorption. Because losses through degradation and volatilization do not contribute to pollutant loadings in sludge, it is not valid to assume that all non-conservative pollutants removed during plant treatment are transferred to sludge. Therefore, for non-conservative pollutants, different equations are used to calculate AHLs based on sludge criteria.

5.2.1 DETERMINATION OF SUITABLE ENVIRONMENTAL CRITERIA

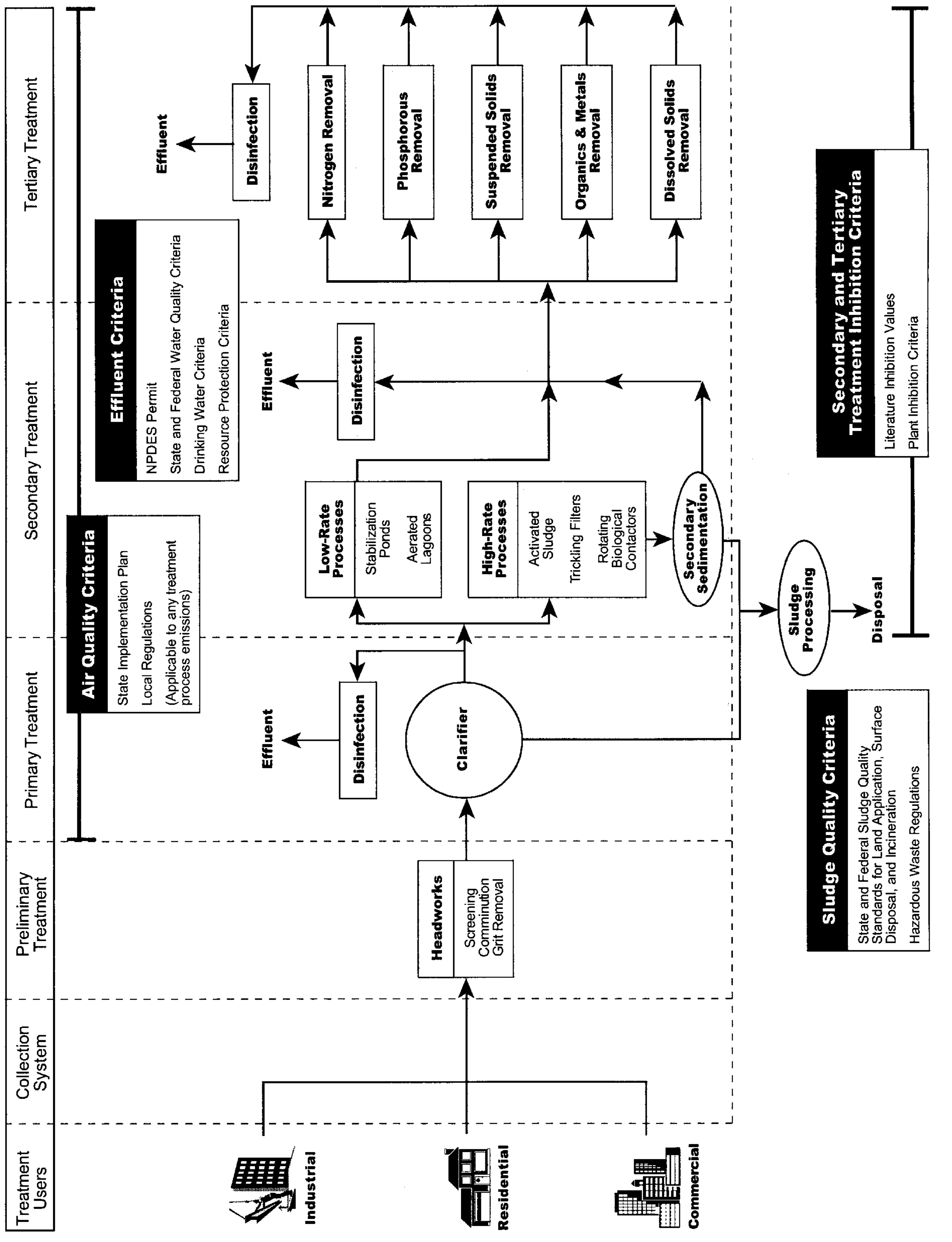
A properly functioning POTW will be in compliance simultaneously with air, effluent, and sludge environmental criteria (see Figure 5-3). In addition, while maintaining this compliance, the POTW should also guard against general process upset or interference. For each POC identified, the POTW should examine the appropriate environmental criteria to guard against interference or pass-through. From these environmental criteria, along with flow rates and removal efficiencies, AHLs are calculated. These environmental criteria should have all been evaluated as part of the POC development in Chapter 3. Table 5-2 shows suggested criteria that should be evaluated for each POC. The next section provides details regarding how to use these criteria in the AHL calculation.

Table 5-2: Suggested Criteria to be Considered For Each POC in the Development of AHLs

Water Quality Based Standards	National Pollutant Discharge Elimination System (NPDES) Permit: effluent limitations, water quality based toxic pollutant limits, Whole Effluent Toxicity (WET)	State Water Quality Criteria and Standards: adoption of federal criteria or stricter	National Recommended Water Quality Criteria for Priority Pollutants: freshwater/saltwater chronic and acute criteria, human health for consumption criteria
Source	POTW's own NPDES Permit	State regulations	Appendix B or National Recommended Water Quality Criteria-Correction. April 1999, EPA 822-Z-99-001
Drinking Water Quality Based Standards*	State and local drinking water standards	National Drinking Water Regulations: maximum contaminant levels	
Source	State regulations and local codes	Appendix G or federal regulations 40 CFR Part 141	
Resource Protection Permits*	State and local groundwater, aquifer, and watershed protection permits		
Source	State regulations and local codes		
Sludge Quality Based Standards	State Sludge Quality Criteria: adoption of federal criteria or stricter	Federal Sludge Standards: land application, surface disposal, or incineration	Hazardous Waste Criteria: Toxic Characteristic Leaching Procedure (TCLP)
Source	State regulations	Appendix D or federal regulations 40 CFR Part 503	Appendix E or federal regulations 40 CFR Part 261.24
Air Quality Based Standards	Local regulatory requirements to meet National Ambient Air Quality Standards (NAAQS)		
Source	State Implementation Plan or local regulatory requirements to meet National Ambient Air Quality Standards (NAAQS)		
Process Inhibition Based Guidelines	POTW's own in-house guideline or criteria for process inhibition	Literature Inhibition Values for activated sludge, trickling filter, and nitrification processes	
Source	POTW reports detailing circumstances surrounding last inhibition	Appendix H	

*EPA is, of course, interested in encouraging encourages POTWs to protect drinking water and ground water sources through the development of local limits. The extent to which this may possible will depend on a POTW's authority under State law and local ordinances.

Figure 5-3: Waste Water Treatment Plant Flow Diagram and Environmental Criteria



5.2.2 EFFLUENT-QUALITY BASED AHLS

National Pollutant Discharge Elimination System (NPDES) Permit

One of the most effective means of restricting the discharge of toxic substances into waters of the United States is through a NPDES permit limit. As illustrated in Equation 5.5, the AHL based on NPDES Permit limit, L_{npdes}, is the pollutant loading at the NPDES Permit Limit, $C_{npdes} * Q_{wwtp}$, divided by the portion of the pollutant not removed by the plant , $(1-R_{wwtp})$. The NPDES permit limit can appear in many forms—specific effluent limitations, water quality-based pollutant limits, whole effluent toxicity—and is commonly expressed as milligrams per liter and specified usually as a daily maximum and/or monthly average discharge limit. In performing the calculation, please note that if a POTW has both a daily maximum and a monthly average NPDES permit limit, the AHL need only be determined for the daily maximum unless the POTW has had NPDES permit monthly average violations since the last local limits analysis. POTWs should use actual average WWTP flow data for Q_{wwtp} and not design flows.

Equation 5.5: AHL Based on NPDES Permit Limit

$$L_{npdes} = \frac{(8.34)(C_{npdes})(Q_{wwtp})}{(1 - R_{wwtp})}$$

Where:
L_{npdes} = Allowable headworks loading based on NPDES permit requirements, lbs/day
C_{npdes} = NPDES permit limit, mg/L
Q_{wwtp} = WWTP flow, average, MGD
R_{wwtp} = Plant removal efficiency from headworks to plant effluent (as decimal)
8.34 = conversion factor

Water Quality Standards or Criteria

In general, POTWs will not have NPDES permit limits for all of the POCs established during the local limits analysis. In such cases, a POTW should base its effluent-quality-based AHL on state Water Quality Standards (WQS) or federal Water Quality Criteria (WQC).[8] State environmental agencies have developed WQS that set maximum allowable pollutant levels for their water bodies, specific to the receiving stream reach's designated uses. Even though the POTW's NPDES permit may not contain a numeric effluent limit for a POC, the permit should contain narrative provisions requiring compliance with state WQS and prohibiting the discharge of any toxic pollutants in toxic amounts. A local limit based on a state WQS fulfills the narrative permit requirement specifying "no discharge of toxics in toxic amounts." *In the absence of state WQS, local limits should be based on EPA ambient WQC found in Appendix B.* These criteria are EPA's recommended maximum pollutant levels for protecting aquatic life. They offer a sound basis for developing local limits for pollutants with the potential for causing toxicity problems in the receiving stream. A local limit based on WQC also fulfills the narrative permit requirement specifying "no discharge of toxics in toxic amounts."

As illustrated in Equation 5.6, the AHL based on water quality criteria, L_{wq}, is calculated as the hypothetical pollutant loading to the water body at the water quality limit, $C_{wq}(Q_{str}+Q_{wwtp})$, adjusted for the background loading of the water body, $C_{str}*Q_{str}$, and divided by the portion of the pollutant not removed by

[8] POTWs should, if possible, use their state's methodology to convert a WQS to NPDES permit limits and then use these calculated NPDES limits to develop the MAHL.

the plant *(1- R_{wwtp})*. C_{str}, the receiving stream background concentration, can be an average background stream concentration. Q_{strm}, the receiving stream (upstream) flow, should be either the 7Q10 or 1Q10 flow based on the particular criteria used. Q_{wwtp}, the average WWTP flow, should be based on actual plant data and not design flows. Under most water quality based analysis, Equation 5.6 is sufficient and consequently is the only one presented here. Another method, using a five-step process based on the one described in EPA's *Technical Support Document For Water Quality-based Toxics Control* (EPA, 1991a).

Equation 5.6: AHL Based on Water Quality Criteria

$$L_{wq} = \frac{8.34[C_{wq}(Q_{str} + Q_{wwtp}) - (C_{str} * Q_{str})]}{1 - R_{wwtp}}$$

Where:
L_{wq} = Allowable headworks loading based on water quality, lbs/day
C_{str} = Receiving stream background concentration, mg/L
C_{wq} = State WQS or EPA WQC, mg/L
Q_{str} = Receiving stream (upstream) flow, MGD
Q_{wwtp} = WWTP flow, average, MGD
R_{wwtp} = Plant removal efficiency from headworks to plant effluent (as decimal)
8.34 = conversion factor

In general, WQS and WQC are classified into three groups: freshwater aquatic life protection, saltwater aquatic life protection, and human health protection. Freshwater and saltwater aquatic life criteria include chronic and acute toxicity criteria. Chronic toxicity criteria are designed to protect aquatic organisms from long term effects over the organisms' lifetime and across generations of organisms, while acute toxicity criteria generally are designed to protect organisms against short-term lethality. EPA offers the following guidance on the use of WQS and WQC.

- **Hardness, pH, and Temperature Dependence.** WQS and WQC for some metals depend on the hardness of the receiving water. If the agency has not factored this in, then the POTW should obtain from the agency the appropriate hardness value for its receiving stream and use this value to determine the applicable WQS or WQC. *Formulas for the common pollutants that are affected by hardness can be found in footnote E to Appendix B.* In addition, WQS or WQC for some inorganic pollutants (e.g., ammonia) are pH- and/or temperature-dependent and should be treated similarly. If the state has not established site-specific values the POTW should contact the state permitting authority to obtain appropriate temperature and pH values for its receiving stream, and then use these to calculate WQS or WQC for AHL calculations.

- **Converting Dissolved Metals to Total Metals.** WQS and WQC for some metals may be expressed in the dissolved form. Most metals measurements, however, are reported in the total or total recoverable form. Total and total recoverable metals concentrations are always at least as high as dissolved metals concentrations because a fraction of the metal has sorbed to particulate matter in the water. If dissolved metals WQS or WQC are used to develop local limits that are expressed in the total metals form, local

Exhibit 5-1: How to Convert Dissolved to Total Metals

NPDES permit writers often use metals translators to convert dissolved water quality standards or criteria to total recoverable equivalents. Translators are specific to each metal and may be 1) the theoretical partitioning coefficients; 2) experimentally determined through site-specific translator studies; or 3) the U.S. EPA conversion factors used to convert dissolved metals criteria to total metals criteria (EPA, 1996). For establishing an AHL, EPA recommends the theoretical partitioning coefficient to calculate metal translators detailed in Appendix S.

[For more information, see *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion* (EPA/823-B-96-007).]

limits will be more stringent than if total metals concentrations are used for the WQS. Therefore, POTWs should convert dissolved metals WQS or WQC into the total metals form before using them to calculate water-quality based AHLs (see Exhibit 5-1).

- **Chronic and Acute Criteria Guidance.** Chronic and acute criteria should be used in the calculation of AHLs to protect receiving water quality. POTWs should not develop a monthly average limit based solely on chronic criteria or a daily maximum limit based exclusively on acute criteria. AHLs should be calculated based on chronic and acute criteria and the more stringent criterion used for comparison with other AHLs. In general, chronic criteria will almost always be more stringent than acute criterion for a given pollutant.

- **Stream Flow Guidance.** To calculate limits based on chronic WQS, the receiving stream flow should be consistent with what the POTW's state recommends for chronic criteria, such as 7Q10 flows. To calculate limits based on acute criteria, the POTW should also use the state-recommended receiving stream flow (e.g., 1Q10). POTWs should consult with their state water quality agencies to confirm the correct flow values.

Resource Protection: Drinking Water, Watershed, Aquifer and Groundwater Protection Zones

POTWs that discharge to drinking water supply zones should consider developing local limits based on maximum contaminant levels (MCLs) for drinking water protection. POTWs should adjust primary and secondary MCLs to final MCLs that account for the pollutant removals that are achieved by drinking water treatment plants. Since a drinking water plant will remove a certain percentage of the pollutant from the source water before delivering it to customers, the source water can have a concentration greater than the MCL and then be treated down to the MCL before consumption or use.

In addition to drinking water standards, POTWs should be aware of any criteria from state and local aquifer, groundwater, and watershed programs. Final MCLs and aquifer, groundwater, or aquifer protection criteria can be used in place of water quality criteria, C_{wq}, in Equation 5.6 to calculate AHLs based on resource protection.

5.2.3 SLUDGE-QUALITY BASED AHLS

In February 1993, EPA issued regulations governing the use or disposal of sewage sludge. Pollutant levels were established for three disposal alternatives: land application, surface disposal, and incineration. The pollutant levels, however, are different for each alternative. In addition to the federal standards, states may have sludge standards that are more stringent or that regulate more pollutants. Therefore, POTWs should check with their state environmental agencies to confirm the applicable standards. Regardless of how a POTW disposes of sludge, EPA encourages POTWs to consider using land application "clean sludge" values from 40 CFR 503.13 in their calculation of AHLs. Use of these criteria can improve a POTW's opportunities for the beneficial use of sludge, which is one of the goals of the National Pretreatment Program. Moreover, the land application standards have a more extensive list of pollutants than either surface disposal or incineration and would help control discharges of toxic pollutants that these disposal alternatives overlook.

Land Application

Federal sludge use or disposal regulations, found at 40 CFR Part 503, establish limitations for nine common metals (arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc) that are primarily controlled by the Pretreatment program. As shown in Appendix D, land application limitations were established as four types and are known by the table number in which they appear:

- Table 1: Ceiling Concentrations (mg/kg) establishes the maximum concentration that can be in sludge when it is land applied.

- Table 2: Cumulative Pollutant Loading Rates (lb/acre) establishes the limits that cannot be exceeded over the lifetime of the disposal site.

- Table 3: Pollutant Concentrations (mg/kg) sets levels considered "clean" sludge and is subject to less restrictive reporting requirements.

- Table 4: Annual Pollutant Loading Rates (lb/acre/year) establishes maximum loadings that can be applied in any given year.

As illustrated in Table 5-3, sludge standards are applied based on biosolid end use. For all biosolid quality types, POTWs must comply with Table 1 ceiling concentrations. If its biosolids are applied to agricultural land, forest, a public-contact site, or a reclamation site, a POTW must comply with either the cumulative loading rates in Table 2 or the monthly average pollutant concentrations in Table 3. If its biosolids are applied to a lawn or home garden, the sludge pollutant concentration may not exceed the monthly average pollutant concentrations in Table 3. If its biosolids are sold or given away in a bag or other container for land application, the POTW must comply with monthly average pollutant concentrations in Table 3 or the annual pollutant loading rates in Table 4.

Table 5-3: Land Application Requirements

Biosolid End Use	Table 1 Ceiling limits (mg/kg)		Table 2 Cumulative limits (lb/acre)		Table 3 "Clean Sludge" Pol. Conc. (mg/kg)		Table 4 Annual limits (lb/acre/year)
Applied to agricultural land, forest, public contact site, reclamation site	x	and	x	or	x		
Applied to lawn or garden	x	and		and	x		
Sold or given away in bag or container	x	and		and	x	or	x

To calculate AHLs based on sludge land application criteria, a POTW should:

- Determine which of the land application criteria applies to its biosolid by using Table 5.3.

- Determine the applicable Table 1, 2, 3, and 4 criteria in Appendix D for each POC.

- Convert the applicable Table 2 cumulative loading rates (lb/acre), C_{cum}, and applicable Table 4 annual pollutant loading rates (lb/acre/year), C_{ann}, to equivalent sludge standard (mg/kg), C_{slgstd}, using Equation 5.7 and Equation 5.8, respectively.

- Determine the lowest sludge standard, C_{slgstd}, derived from Equation 5.8, Equation 5.9, Table 1 Ceiling Concentrations, Table 3 Monthly Average Pollutant Concentrations, and suitable state sludge standards.

- Use Equation 5.9 with the lowest sludge standard, C_{slgstd},, to determine the sludge land-application-based AHL for conservative pollutants. As shown in Equation 5.9, the AHL for land application, L_{sldg} , is the pollutant loading of sludge at the sludge standard, $(C_{slgstd}) * (PS/100) * (Q_{sldg}) * (G_{sldg})$, divided by the overall plant removal rate, R_{wwtp}.

Equation 5.7: Converting Table 2 Cumulative Loading Rates to Dry Sludge Concentrations

$$C_{slgstd} = \frac{(C_{cum})(SA)}{3046(SL)(Q_{bla})(PS/100)(G_{sldg})}$$

Equation 5.8 : Converting Table 4 Annual Loading Rate to Dry Sludge Concentrations

$$C_{slgstd} = \frac{(C_{ann})(SA)}{3046(Q_{la})(PS/100)(G_{sldg})}$$

Where:

C_{slgstd} =	Equivalent sludge standard, mg/kg dry sludge
C_{cum} =	Federal or State land application cumulative pollutant loading rate (lbs/acre over the site life)
C_{ann} =	Federal or State land application annual pollutant loading rate (in lbs/acre/yr)
G_{sldg} =	Specific gravity of sludge (kg/L)
PS =	Percent solids of sludge to disposal
Q_{bla} =	Sludge flow to bulk land application (agricultural, forest, public contact, or reclamation site), MGD
Q_{la} =	Sludge flow to non-bulk land application, MGD
SA =	Site area, acres
SL =	Site life, years
3046 =	unit conversion factor

EPA offers the following guidance in performing the calculations in Equations 5.7 through 5.9:

- The values for site life, *SL*, and site area, *SA*, are determined by a POTW's sludge management plan. The POTW determines how long the sites will be used and how much land or acreage is needed for disposal of the total annual volume of sludge generated. Generally, the amount of land needed is determined by dividing the total annual sludge production (tons) by the agronomic application rate for nitrogen (tons/acre) based on the crop grown**.**

- While EPA recommends using clean sludge levels, under no circumstances should values greater than the Table 1 ceiling concentrations be used for C_{stgstd}, even if the POTW intends to bulk its sludge prior to disposal.

- Generally, POTWs can assume the specific gravity of sludge, G_{sldg}, equals that of water (1 kg/L). For a typical wet sludge containing about 5 percent solids, *PS*, the specific gravity of the sludge does not differ significantly from that of water. However, drier sludges such as dewatered sludges with 30 percent solids may have a specific gravity of 1.1 or greater. In these circumstances if the specific gravity is not considered, AHLs will be understated and any local limits based on these AHLs may be unnecessarily conservative. Therefore, the POTW can measure the specific gravity of its sludge to correct for the error introduced as the percent solids rises. If the POTW does not have data on the specific gravity of its sludge, it should assume conservatively that the specific gravity is 1 kg/L. *Guidance for determining the specific gravity of sludge is provided in Appendix T.*

- If the POTW's data for sludge flow to disposal are expressed in dry metric tons per day (or can be converted to dry metric tons per day), a specific gravity factor is not needed. An equation for calculating an AHL using dry metric tons per day is provided in Appendix U.

- Table 1 sludge ceiling concentrations are instantaneous maximum concentrations, while the "clean sludge" criteria in Table 3 are monthly average concentrations. Either one can be used to establish local limits as monthly averages because of protracted residence time for sludge digestion and disposal. If the limit is considered a monthly average, however, a daily maximum limit will need to be established based on more temporal conditions such as pass through.

5.2.4 SURFACE DISPOSAL

Sludge surface disposal occurs at dedicated disposal sites, surface impoundments, waste piles, monofills, or dedicated beneficial use sites. The difference between surface disposal and land application is that land application is performed at rates that do not exceed the agronomic rates of the fertilizer value of the sludge. For a more extensive discussion of surface disposal see the sludge regulations at 40 CFR 503.20. Surface disposal regulates only three metals (arsenic, chromium, and nickel) at levels near the "clean sludge" levels for land application. The standards apply to sludge disposed at facilities without a liner or a leachate collection system. AHLs based on sludge surface disposal quality should be calculated in the following manner:

Equation 5.9: AHLs Based on Sludge Land Application and Surface Disposal Criteria (for conservative pollutants)

$$L_{sldg} = \frac{(8.34)(C_{slgstd})(PS/100)(Q_{sldg})(G_{sldg})}{R_{wwtp}}$$

Where:

L_{sldg} =	Allowable headworks loading, lbs/day
C_{stgstd} =	Sludge standard, mg/kg dry sludge
PS =	Percent solids of sludge to disposal,
Q_{sldg} =	Total sludge flow to disposal, MGD
R_{wwtp} =	Plant removal efficiency from headworks to plant effluent (as decimal)
G_{sldg} =	Specific gravity of sludge (kg/L)
8.34 =	unit conversion factor

- Table 1 (40 CFR 503.23) sludge surface disposal criteria should be used directly as the sludge standard, C_{stgstd}, in Equation 5.9 for conservative pollutants.

- If the sewage sludge unit is less than 150 meters from the property line, Table 2 (40 CFR 503.23) sludge disposal criteria, based upon distance from the property line, should be used directly as the sludge standard, C_{stgstd}, in Equation 5.9 for conservative pollutant.

In addition, POTWs should be aware that surface disposal regulations allow for site-specific limits. Site owners or operators may have requested surface disposal criteria from the permitting authority in place of the Table 1 or Table 2 sludge surface disposal standards. Therefore, the POTW should check with the disposal site owner/operator to determine standards that apply. If the state has developed more stringent sludge disposal standards for surface disposal, the POTW needs to use those standards in its calculation of AHLs when using Equation 5.9.

Incineration

Incineration, the third method of sludge disposal, regulates arsenic, cadmium, beryllium, chromium, lead, mercury, and nickel. Limits are site-specific and based on feed rate, stack height (dispersion factor), incinerator type, and control efficiency. EPA offers the following guidance on incineration-based AHLs:

- POTWs that dispose of their sludge through incineration should determine AHLs based on the calculated sludge standards that apply to the sludge feed to the incinerator. These standards may have been calculated by the owner/operator of the incinerator (and listed in a sludge disposal agreement), the state, or EPA from the equations provided in 40 CFR Part 50, and should be expressed in mg/kg dry sludge. These standards should be used directly as the sludge standard, C_{stgstd}, in Equation 5.9 to determine the AHL.

- If no sludge standards have been calculated for the sludge feed to the incinerator, POTWs should use the 40 CFR Part 503 equations (provided in Appendix U) to determine the maximum pollutant concentrations for the incinerator feed. These standards should be used directly as the sludge standard, C_{stgstd}, in Equation 5.9 to determine the AHL. As a general rule, an AHL for incineration will be an order of magnitude or greater than an AHL based on land application. As stated earlier, EPA encourages facilities that incinerate their sludge to base their sludge disposal AHL on land application requirements since this provides the maximum flexibility for sludge reuse.

Hazardous Waste Requirements

Whether a POTW's sewage sludge is a hazardous waste may be determined by using EPA's TCLP test. If determined to be hazardous waste, sludge must be disposed of according to expensive RCRA requirements. POTWs cannot dispose of sludge determined to be hazardous waste in solid waste landfills designated for non-hazardous waste. In general, POTWs will not generate sludge that exceeds TCLP limits.

However, since the costs and liabilities associated with the management and disposal of hazardous sludge are high, POTWs may find it advantageous to periodically run the TCLP test on their sludge to identify any trends of increasing pollutant concentrations that may lead the sludge to be considered hazardous waste. The POTW should compare the quality of its sludge with the limits in the TCLP and, as necessary, set local limits to help ensure that the pollutant levels in its sludge do not exceed TCLP levels. According to RCRA guidance, if a municipal sludge has a total pollutant concentration of less than 100 times the allowable TCLP limit, the sludge will likely meet the TCLP criteria establishing characteristic wastes. *If*

TCLP test results are close to or exceed the TCLP limit, the POTW needs to develop AHLs based on TCLP criteria. To develop TCLP-based AHLs, the POTW should:

- Determine the dry weight metals and toxic organics concentrations (in mg/kg dry sludge) that would be protective against sludge being classified as hazardous based on the TCLP test from monitoring data. The POTW can collect site-specific data for both total pollutant concentrations in the sludge and TCLP concentrations (10-12 data pairs) and use these data to correlate TCLP concentrations with total concentrations in the sludge.

- Use these dry-weight, correlation-based, concentrations directly as the sludge standard, C_{stgstd}, in Equation 5.9 to determine the AHL.

5.2.5 INHIBITION-BASED AHLS

Secondary and Tertiary Treatment Unit Inhibition

Pollutants levels in a POTW's wastewater or sludge may cause operational problems for biological treatment processes involving secondary and tertiary treatment. Disruption of a POTW's biological processes is referred to as inhibition and can interfere with a POTW's ability to adequately remove biochemical oxygen demand (BOD) and other pollutants. A POTW should assess any past or present operational problems related to inhibition and follow the protocol outlined below:

> **Exhibit 5-2: The Difficulty in Determining Plant Inhibition Values**
>
> Determining site-specific inhibition values is difficult due to the necessity of establishing the exact point at which pollutant concentration inhibition takes place. For instance, an activated sludge system's mixed liquor may run at about 1 mg/L zinc. An industrial discharge causes the plant to violate its NPDES permit by upsetting the plant and raising the mixed liquor concentration to 100 mg/L zinc. How can one determine at which concentration the inhibition took place? The concentration lies somewhere between 1 and 100 mg/L. An inhibition values set at 100 mg/L would be incorrect because a lower value could have caused the inhibition. Some POTWs have attempted to estimate site-specific inhibition values by simply using the highest observed pollutant concentration in the biological process that did not cause interference.

- **No Past Inhibition Problems at POTW**. POTWs may not need to calculate AHLs to protect against inhibition since current loadings are acceptable to the treatment work's biological processes. However, a POTW may still choose to calculate AHLs based on biological process inhibition criteria to prevent future loadings that may cause inhibition. In this case, the POTW may choose to substitute pollutant concentrations which either have occurred in the applicable biological process or are currently in its influent and have not caused inhibition, in place of process inhibition values that have been reported in studies published by EPA or in professional journals. *Inhibition criteria for select secondary treatment units (such as activated sludge and trickling filters) and one tertiary treatment unit (nitrification) are presented in Appendix H.*

- **Past Inhibition Problems at POTW.** POTWs should calculate AHLs based on inhibition criteria. In most cases, a POTW will not have site-specific inhibition data (see Exhibit 5-1) and will need to use process inhibition values that have been reported in studies published by EPA or in professional journals. *Inhibition criteria for select secondary treatment units (such* *as activated sludge and trickling filters) and one tertiary treatment unit (nitrification) are presented in Appendix H.*

Equation 5.10: AHLs Based On Secondary Treatment Inhibition

$$L_{sec} = \frac{8.34(C_{inhib2})(Q_{wwtp})}{(1 - R_{sec})}$$

Equation 5.11: AHLs Based On Tertiary Treatment Inhibition Based AHLs

Where:

$$L_{ter} = \frac{8.34(C_{inhib3})(Q_{wwtp})}{(1 - R_{ter})}$$

L_{sec} =	AHL based on secondary treatment inhibition, lbs/day
L_{ter} =	AHL based on tertiary treatment inhibition, lbs/day
C_{inhib2} =	Inhibition criteria for secondary treatment, mg/L
C_{inhib3} =	Inhibition criteria for tertiary treatment, mg/L
Q_{wwtp}=	WWTP flow, MGD
R_{sec} =	Removal efficiency from headworks to secondary treatment influent (as decimal)
R_{ter} =	Removal efficiency from headworks to tertiary treatment influent (as decimal)
8.34 =	unit conversion factor

Site-specific data are preferred to literature data because they more accurately measure pollutant concentrations that cause inhibition. Sometimes based on laboratory studies using pure cultures, literature values can indicate inhibition at much lower concentrations than in actual biological treatment environments for four main reasons: 1) organic chemicals are combining with the metals and reducing metal availability to the microbes; 2) activated sludge environments generally have a variety of organisms present that may not be as sensitive to metal concentrations; 3) metals can chelate toxic organics, reducing their toxicity to nitrifiers; 4) acclimated biological treatment populations can accept higher concentrations of metal and organic toxins.

Equation 5.10 is used to calculate inhibition-based AHLs for secondary treatment processes such as aerated lagoons, stabilization ponds, activated sludge, rotating biological contactors, and trickling filters. Equation 5.11 is used to calculate inhibition-based AHLs for tertiary treatment for various processes to remove nitrogen, phosphorus, suspended solids, organics, metals, and dissolved solids (see Figure 5-3). As shown in Equation 5.10, L_{sec}, the AHL based on secondary treatment unit inhibition, is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criteria, $C_{inhib2} * Q_{wwtp}$, by the portion of the pollutant not removed before secondary treatment, $(1 - R_{sec})$. As shown in Equation 5.11, L_{ter}, the AHL based on tertiary treatment unit inhibition, is calculated by dividing the pollutant loading to the tertiary treatment unit at the inhibition criteria, $C_{inhib3} * Q_{wwtp}$, by the portion of the pollutant not removed before tertiary treatment, $(1 - R_{ter})$. The WWTP flow rate, Q_{wwtp}, should be calculated using actual average flow data and not design flow. Appendix N shows where to sample in various plants to calculate inhibition based loading.

Sludge Digester Inhibition

Sludge digestion is also a biological process that can be upset if pollutants are allowed to accumulate to toxic levels. Plant-specific sludge digestion inhibition thresholds, like inhibition of secondary treatment, are difficult to know. *Literature data on sludge digester inhibition criteria are listed in Appendix H.* The preponderance of sludge digestion inhibition levels are for anaerobic digesters. Less is known about the effect of metals on aerobic digestion.

Using the steady-state mass balance approach across the influent to the digester, Equation 5.12 calculates the AHL based on sludge digestion inhibition, L_{dgstr}, for conservative pollutants such as metals. L_{dgstr} is calculated by dividing the pollutant loading at the inhibition criteria to the digester, $C_{dgstinhib} * Q_{dgstr}$, by the removal efficiency across the entire WWTP, R_{wwtp}. As shown in Equation 5.13, for non-conservative pollutants, L_{dgstr} is found by multiplying the POTW influent loading, L_{infl}, by the ratio of the sludge digester inhibition criteria, $C_{dgstinhib}$, and the level of the POC in the sludge, C_{dgstr}.

Equation 5.12: AHLS Based On Sludge Digestion Inhibition

$$L_{dgstr} = \frac{8.34(C_{dgstinhib})(Q_{dgstr})}{R_{wwtp}}$$

conservative pollutants

Equation 5.13: AHLS Based On Sludge Digestion Inhibition

$$L_{dgstr} = (L_{infl}) * \frac{C_{dgstinhib}}{C_{dgstr}}$$

non-conservative pollutants

Where:

L_{dgstr} =	AHL based on sludge digestion inhibition, lbs/day
L_{infl} =	POTW influent loading, lbs/d
$C_{dgstinhib}$ =	Sludge digester inhibition criteria, mg/L
C_{dgstr} =	Existing pollutant level in sludge, mg/L
Q_{dgstr} =	Sludge flow to digester, MGD
R_{wwtp} =	Plant removal efficiency from headworks to plant effluent (as decimal)
8.34 =	unit conversion factor

5.2.6 AIR-QUALITY BASED AHLS

POTWs that have been regulated as air pollution sources and have air emissions standards for specific toxics may need to consider calculating AHLs for those toxics. AHLs based on air emissions standards can be calculated using either Equation 5.14, which uses the air standard and removal efficiency by volatization, or Equation 5.15, which uses air standard and existing air emissions. The POTW can conduct air emissions sampling or conduct modeling to predict existing air emissions, C_{air}. (EPA, 1982; EPA, 1984; Parker, 1993; Van Slyke, 1993; Bell, 1993). POTWs can determine pollutant removal efficiency by volatilization, R_{vol}, by examining sampling data of influent, effluent, sludge, and air and determining the portions of the total removal efficiency associated with adsorption to the sludge, biodegradation, and volatilization. In addition, POTWs can model the removal process to predict pollutant removal efficiency by volatilization.

Equation 5.14: AHLs Based On Air Emission Criteria

$$L_{air} = \frac{0.0022(C_{airstnd})}{R_{vol}}$$

Equation 5.15: AHLs Based on Air Emission Criteria

$$L_{air} = (L_{infl}) * \frac{C_{airstnd}}{C_{air}}$$

Where:

L_{air} =	AHL based air emission standards, lbs/day
L_{infl}=	POTW influent loading, lbs/d
$C_{airstnd}$=	Air emissions standard, g/day
C_{air} =	Existing air emissions, g/day
R_{vol} =	Pollutant removal by volatilization (as decimal)
0.0022 =	Unit conversion factor

5.3 AHLS FOR CONVENTIONAL POLLUTANTS

This section provides guidance on the development of AHLs for four conventional pollutants—BOD, total suspended solids (TSS), ammonia, and oil and grease—whose unique circumstances allow for special mechanisms for their AHL development.

5.3.1 BOD/TSS

One of the most commonly documented industry-related causes of POTW effluent violations is the discharge of excessive conventional pollutants, particularly BOD and TSS. As stated earlier in the chapter on POC development, POTWs should develop MAHLs for all NPDES-permitted conventional pollutants and understand the degree to which the plant is loaded. In fact, some EPA regions require any wastewater treatment plant that operates at 80 percent of any NPDES permitted conventional pollutant MAHL for 3 months of the calendar year to calculate an MAIL and establish local limits for those pollutants so loaded.

EPA recommends that the MAHLs for BOD and TSS be based on the POTW's design capacity and on any improvements subsequent to construction that have increased plant capacity. The treatment works is designed to have the capacity to consistently treat a specified amount of conventional pollutants to acceptable levels for discharge. *For BOD and TSS, the POTW should use the design daily average as the MAHL.* Equation 5.5 should not be used to calculate a MAHL through the use of NPDES permit limits and site-specific removal efficiencies if engineering specification are known. This would result in a MAHL greater than the plant's design capacities because it would be measuring, in effect, that portion of the plant's design that was set aside by its engineers through the application of the design safety factor. However, if the engineering specifications are not known, POTWs can use Equation 5.5 to calculate the AHL if site-specific removal efficiencies that were determined during the winter are used. POTWs, in developing the local limits from a BOD/TSS MAHL, should apply an appropriate safety factor of at least 20 percent.

Some treatment plants may not be able to meet NPDES permit limits consistently while operating at design loading levels. For these facilities an engineering analysis should be conducted using the plant's current operating data to determine a MAHL. If the POTW determines that local limits for conventional pollutants should be established, the POTW should ensure that limits are clearly distinguished from any surcharge program that recovers additional costs for treating extra-strength wastewater from industrial users.

5.3.2. AMMONIA

If the POTW was designed to remove ammonia through specific processes such as nitrification and denitrification, breakpoint chlorination, or ammonia stripping, the engineering specifications that establish design loading rates should be used as the MAHL. However, for most conventional activated sludge and trickling filter plants, ammonia removal is incidental, and a study of the plant will have to be conducted to determine its removal efficiency. The AHL for ammonia can then be determined using Equation 5.5. When the AHL is determined using site-specific removal efficiencies and Equation 5.5, a safety factor of at least 20 percent should be applied to establish a safety factor. NPDES ammonia limits are often seasonal, with more stringent limits in place during warmer weather. This needs to be taken into consideration in the development of local limits. A seasonal limit for ammonia might be developed for IUs as well. Typical concentrations of ammonia in untreated domestic wastewater range from 10 to 50 mg/L. Therefore, significant non-domestic industrial sources of ammonia will be unusual and the result of industry-specific activities.

5.3.3. OIL AND GREASE

The pretreatment regulations prohibit the discharge of "petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through." Most POTWs have adopted 100 mg/L as their local limit for fat, oil and grease (FOG), based on a history of showing itself to be protective of the treatment plant and receiving stream, and based on the achievability of limit of 100 mg/L with the application of best management practices or generally available pretreatment. However, the basis for the 100 mg/L FOG limit is not site specific. The limit should be justified with additional information in order to be considered a technically-based limit. The basis of the 100 mg/L limit is an April 1975 EPA document titled *Treatability of Oil and Grease Discharged to Publicly Owned Treatment Works*. This study found a dilution of at least 2X occurs in collection systems and that influent to biological treatment systems should contain less than 75 mg/L and preferably less than 50 mg/L oil and grease of mineral or petroleum origin to prevent interference. The 100 mg/L was recommended as the value that prevents interference based on the dilution.

The term FOG includes materials of vegetable, animal, and mineral origin. Mineral oils include petroleum, hydrocarbon, and or non-polar fats, oils, and grease. Petroleum-based oil and grease (non-polar concentrations) occur at businesses using oil and grease; and can usually be identified and regulated by municipalities through local limits and associated pretreatment permit conditions. Animal and vegetable-based oil and grease (polar concentrations) are more difficult to regulate when the major source is a large number of restaurants and fast-food outlets in the collection system.

The specific limit for FOG and the strategy for controlling it need to be based on the type of FOG, the types of sources, and the levels of FOG that begin to present problems in the collection system or at the POTW. Developing a technically-based local limit for FOG requires an understanding of the unique manner in which oil and grease can cause interference or pass through. If merely protecting the plant were a concern, a POTW could determine a removal efficiency based on plant influent and effluent levels and use Equation 5.5 to develop an AHL based on the plant's numeric NPDES permit limit. Different kinds of FOG have different consequences in the aerobic biological treatment process. Animal and vegetable oils that are dispersed in wastewater at reasonable concentrations are easily broken down and removed in a POTW. Biological treatment of petroleum-based FOG is a very slow process that cannot be accomplished effectively in a typical POTW. Petroleum-based oils can coat the organisms responsible for biological treatment and result in less effective oxygen transfer rates.

In anaerobic processes, excessive concentrations of solid grease in digesters can reduce the effectiveness of the process and can lead to structural damage to pipes and supports as a result of the weight of scum and grease. When digesters are well mixed and heated to minimize scum loads, reasonable concentrations of FOG can be anaerobically digested. Petroleum-based oils are not degraded adequately in a POTW digester and can present accumulation problems when supernatant is recycled.

FOG can interfere with the POTW's collection system through blockages when the wastewater cools sufficiently to allow the suspended fat, oil, or grease to congeal. This condition is a function primarily of interceptor size, length, and slope; ambient temperature; wastewater temperature; and concentration of FOG. These factors vary throughout the collection system. To develop a technically-based FOG limit to protect the collection system, empirical data (observations and measurements) are needed to document problems and contributing factors. The empirical data along with generally available pretreatment and control measures for FOG become the technical basis for the limit proposed.

To collect data, the POTW identifies collection system sections that have a critical low slope (relatively flat) profile and may be subject to low temperatures. Data are collected that identify FOG levels corresponding to deposition rates of solidified oil and grease. The level of oil and grease at which deposition is negligible would be the basis for the collection system MAHL.

5.4 DETERMINATION OF THE MAXIMUM ALLOWABLE HEADWORKS LOADING

After calculating AHLs for each POC for a variety of environmental criteria, MAHL determination is very simple. *The lowest (i.e., most stringent) of the AHLs for each POC is selected as the MAHL for that pollutant.* Influent loadings below the MAHL will ensure compliance with the AHLs based on all environmental and treatment plant criteria. The MAHL will be used for all further steps of local limits development and evaluation.

5.5 SAMPLE MAHL CALCULATION

POTW Y is attempting to determine the MAHL for copper. Through an extensive monitoring plan, POTW Y has determined the following plant data:

- Plant removal efficiency from headworks to plant effluent, R_{wwtp} = 0.85
- Removal efficiency from headworks to secondary treatment influent, R_{sec} = 0.65
- Average plant flow rate, Q_{wwtp} = 10 MGD
- Percent solids in the sludge, PS = 5 percent
- Specific gravity of sludge, G_{sludge} = sludge density(kg/l) ÷ density of water(1 kg/l)
- Average sludge flow rate, Q_{sludge} = 0.05 MGD

For copper, POTW Y determines that the suitable environmental criteria are the following:

- The WWTP has a specific copper limit in its NPDES permit, C_{npdes} = 1 mg/L copper.

- With biosolids being used ultimately for lawn application, Federal Sludge Land Application Table 3 "Clean Sludge" Limits, C_{stgstd} = 1,500 mg/kg copper, are applicable.

- Although inhibition has never taken place at the plant's activated sludge secondary treatment unit, the POTW wants to develop an AHL based on activated sludge inhibition. The value in the literature is C_{inhib2} = 1 mg/L copper.

The following equations for AHLs based on NPDES limits (Equation 5.5), sludge standards (Equation 5.9), and secondary treatment inhibition (Equation 5.10) are used.

$$L_{npdes} = \frac{(8.34)(C_{npdes})(Q_{wwtp})}{(1 - R_{wwtp})} = \frac{(8.34)(1\,mg/L)(10\,MGD)}{(1 - 0.85)} = 556\,lb/day$$

$$L_{sldg} = \frac{(8.34)(C_{slgstd})(PS/100)(Q_{sldg})(G_{sldg})}{R_{wwtp}} = \frac{(8.34)(1{,}500\,mg/kg)(5/100)(0.05\,MGD)(1\,kg/L)}{0.85} = 37\,lbs/day$$

$$L_{sec} = \frac{8.34(C_{inhib2})(Q_{wwtp})}{(1 - R_{sec})} = \frac{8.34(1\,mg/L)(10\,MGD)}{(1 - .65)} = 208\,lbs/day$$

From these three AHLs, the most stringent (lowest) AHL based on the sludge standard, L_{sldg}, was chosen as the MAHL for copper at 37 lbs/day.

5.6 CONCLUSION

After reviewing Chapter 5, POTWs should be able to:

- Calculate POTW removal efficiencies for each POC
- Calculate allowable headworks loadings (AHLs) for each environmental criteria
- Determine MAHL as the most stringent AHL for each POC

In the next chapter, the POTW will address the need for local limits, allocate the maximum allowable industrial loadings, and develop final local limits.

CHAPTER 6 -
DESIGNATING AND IMPLEMENTING LOCAL LIMITS

Chapter 6 provides guidance on how to:

- Evaluate the need for local limits after establishing POCs;
- Implement local limits;
-
- Perform a common sense assessment of local limits;
- Provide public participation;
- Gain Approval Authority approval;
- Conduct public outreach; and
- Select the appropriate control mechanism to apply local limits.

6.1 DETERMINING THE NEED FOR LOCAL LIMITS

Once a POTW has calculated maximum allowable headworks loadings (MAHLs) for all of its pollutants of concern (POCs), it needs to determine for which pollutants it will establish local limits. In making this pollutant-by-pollutant evaluation, the POTW should consider historical issues and the degree to which current effluent loadings approach calculated MAHLs. For example, the concentration of some pollutants in the POTW influent may be far below the calculated MAHLs. These pollutants are unlikely to cause problems for the POTW, so the treatment works may propose that local limits for them are unnecessary. The POTW should document such decisions and may need to discuss them with its Approval Authority.

Some Approval Authorities require that local limits be established for a specific set of pollutants regardless of the outcome of the headworks loading analysis. Establishing local limits when the analysis is performed may be the most efficient use of resources because it avoids additional approval and adoption steps if a local limit needs to be set for a pollutant in the future. POTWs are required to include local limits only in SIU permits and to establish routine user monitoring for the pollutants expected to be present in each user's discharge. Consequently, developing and adopting local limits for pollutants other than those for which local limits are needed immediately would not increase the regulatory burden on the POTW or the user.

No single approach applies for all pollutants at all POTWs. Common approaches to determine the need for local limits are discussed below.

6.1.1 ACTUAL LOADINGS VS. MAHL

Equation 6.1 compares actual POTW loadings to calculated MAHLs for individual POCs. A POTW would use this equation to:

- Compare *average* current loadings to MAHLs, establishing local limits where loadings reach a specified percentage of the MAHLs.

- Compares the *highest daily* influent loading to the MAHL, establishing a local limit where this loading approaches the MAHL value.

When comparing actual loadings against the MAHLs for toxic pollutants, local limits should be set where the average actual loading of a pollutant exceeds 60 percent of the MAHL, or where the maximum actual loading exceeds 80 percent of the MAHL any time in the 12-month period preceding the analysis. For BOD_5, TSS, and ammonia, a local limit would be established where the monthly average influent loading reaches 80 percent of average design capacity for the pollutant during any one month in the 12-month period preceding the analysis. The approach used for toxic pollutants is more conservative because most POTWs are not designed to treat toxic pollutants.

Equation 6.1: Actual Loading vs. MAHL Calculation

$$L_{\%} = \frac{L_{INFL}}{L_{MAHL}}$$

Where:
$L_{\%}$ = percentage of the MAHL
L_{INFL} = current influent loading (average or highest)
L_{MAHL} = calculated MAHL

6.1.2 NONCOMPLIANCE DUE TO PASS THROUGH OR INTERFERENCE

The basic purpose of the pretreatment program is to prevent pass through and interference, and the General Pretreatment Regulations require that local limits be established to prevent them. A POTW that has experienced pass through or interference in the past must establish local limits to control the pollutants responsible for the noncompliance, regardless of whether the problem remains ongoing. By reviewing past NPDES permit violations, sludge disposal restrictions, or inhibition incidents, the POTW can identify the pollutants for which it should set local limits.

As noted above, POTWs should consult with their Approval Authorities to determine whether local limits should be established for specific pollutants regardless of their actual impact. For example, some Approval Authorities specify that local limits be developed for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc regardless of whether they are in the POTW's influent. If such specific guidance is not available, the POTW should conduct evaluations for each POC at each treatment works.

The approach presented here is intended primarily to determine which POCs not now covered by local limits should be covered by them. A POTW should not use the above criteria to determine whether a local limit covering a particular pollutant is no longer needed because the local limit may be the reason that a loading has been reduced or is no longer causing problems. If the local limit were removed, IUs may discontinue their use of wastewater pretreatment and POTW loadings may increase above the threshold in the criteria. Re-evaluation of existing local limits is discussed in Chapters 7 and 8.

6.2 IMPLEMENTING LOCAL LIMITS

Uniform-concentration local discharge limitations have become synonymous in the Pretreatment Program with the term "local limits," but local limits can take many forms based on the calculated MAILs that are allocated to IUs. The implementation of these MAILs, including the allocation of loadings to IUs, is left to each POTW, as long as the implementation procedures do not allow the calculated MAHL to be exceeded and provide a reasonable method for making allocations to the IUs. This section describes some of the implementation decisions facing POTWs. The selection of an appropriate implementation approach is an integral aspect of a POTW's local limits process. To implement local limits, a POTW must:

(1) Determine how much of each MAHL is available for industrial and other controllable sources (i.e., determine MAILs).

(2) Determine how best to allocate loadings to industrial and other controllable sources so that MAHLs are not exceeded.

(3) Provide for public participation.

(4) Apply for and receive approval of the local limits from the Approval Authority.

(5) Implement the local limits through individual IU control mechanisms (e.g., permits) for SIUs, a local sewer use ordinance, or other enforceable mechanisms for other users.

Equation 6.2: MAIL Calculation

$$MAIL = MAHL(1 - SF) - (US + HW + GA)$$

Where:

MAIL =	Maximum allowable industrial loading, lbs/day
MAHL =	Maximum allowable headworks loading, lbs/day
SF =	Safety factor, if desired
US =	Loadings from uncontrolled sources (uncontrolled sources= domestic + some commercial + I&I)
HW =	Loadings from hauled waste, if not regulated through the local limits
GA =	Growth allowance.

A POTW can use any of several approaches to implement these steps. The steps and some additional considerations are discussed below. The POTW may find that the best approach may not be exactly the same for all the pollutants that need local limits.

6.2.1 ALLOCATION OF MAHLS/DETERMINATION OF MAILS

The MAHLs calculated by the POTW represent the maximum combined loadings that can be received at the POTW's headworks from all sources. Since only some of these sources are considered controllable, the calculation of MAILs is intended to regulate the discharges from only these controllable sources, while accounting for the contribution from the uncontrollable sources. Consequently, the POTW must subtract from each MAHL the portion of the loading that is contributed by uncontrollable sources. Uncontrollable sources include domestic users, inflow and infiltration (I&I), and some or all of a POTW's commercial dischargers. A POTW may choose to regulate or limit the discharges from some or all of its commercial dischargers (e.g., dental offices, hospitals, and restaurants), in which case they would be considered controllable sources. The portion of a MAHL that remains after subtracting loadings from uncontrollable sources is the maximum allowable industrial loading (MAIL) (see Equation 6.2). To determine its MAILs, a POTW needs the information listed in Table 6-1:

Table 6-1. Data for Implementation of MAHLs

Parameter	Comments	Source of Data
IU flow	Total flow from all IUs, plus any commercial dischargers that the POTW intends to control	POTW local use monitoring program, periodic reports from SIUs
Uncontrolled source pollutant concentrations	Levels of POCs in domestic and commercial discharges that the POTW does not intend on controlling with local limits	POTW local use monitoring program
Uncontrolled source pollutant flow	Flow from all uncontrolled sources, either in total or divided by type of facility (domestic, commercial, I&I, storm water)	POTW local use monitoring program
Hauled waste loadings	Based on volume and pollutant concentration data	POTW sampling of waste hauler loads
Safety Factor	Varies depending on quality and amount of data	POTW choice based on data analysis
Growth allowance	Varies based on the projected growth for the area	POTW choice based on data analysis

6.2.2 Controlled Sources (IUs, and Some Hauled Waste and Commercial Users)

The MAILs developed by the POTW represent the amount of pollutant loadings the POTW can receive from controlled sources -- industrial users and commercial users -- that the POTW chooses to control through local limits. Discharges from some waste haulers may be regulated by POTWs and so may be considered controlled sources. Unless the wastes are hauled from a regulated industrial facility, however, the POTW may not expect these wastes to be treated prior to discharge. If the POTW does not intend to regulate these hauled wastes through local limits, the loadings from these sources should be included with the uncontrolled sources.

6.2.3 Safety Factor

Determining safety factors is an imprecise process, which has the potential to affect significantly the final local limits, so the POTW should carefully consider its choice of a safety factor. A safety factor is site-

Exhibit 6-1: Safety Factor Example

If a POTW's data for cadmium were all below detection and the POTW used literature data for cadmium removal efficiencies, the treatment works should consider using a safety factor for cadmium. At the same time, if the POTW's zinc data were mostly above detection and the daily removal efficiencies were all between 60 and 80 percent, the POTW may not need to use a safety factor for zinc. The decision to use a safety factor for zinc removal on pass through would depend on the quality of the data used to calculate the removal efficiency. In this example, we will assume that the removal efficiency is based on 12 months of paired influent and effluent samples that range from 60 and 80 percent which were collected as hydraulically lagged pairs. Because this data set is of high quality, the POTW might not use a safety factor. If an ADRE is calculated, it will lie in the 60 to 80 percent range. If the ADRE is 72 percent, the POTW will want to consider the degree of safety that would exist should the actual removal efficiency be lower. This, along with the potential to violate water quality standards or NPDES effluent limits, also needs to be considered.

Note that the ADRE for pass through is the same value used for sludge quality protection calculations. The POTW should also examine the data set to determine the potential for removals to be higher than the ADRE, and for the potential to violate the quality criteria for sludge disposal.

specific and depends on local conditions. Some Approval Authorities may have mandatory safety factors. At a minimum, EPA generally recommends a 10 percent safety factor. The determination of whether a safety factor is needed and, if it is, how large the safety factor should be depends on the following elements:

- The variability of the POTW's data.
- The amount of data the POTW used in its development of MAHLs.
- The quality of the POTW's data.
- How much literature data the POTW used.
- The history of compliance with the parameter.
- The potential for IU slug loadings (e.g., as a result of chemical spills).
- The number and size of each IU with respect to the POTW's flow.

The POTW may use different safety factors for different pollutants. The above elements may vary from pollutant to pollutant, making it appropriate for a POTW to use different safety factors (see Exhibit 6-1).

Equation 6.3: Uncontrolled Loading Calculation

$$L_{UNC} = (C_{UNC})(Q_{UNC})(8.34)$$

Where:
L_{UNC} = Uncontrolled loading, lbs/day
C_{UNC} = Uncontrolled pollutant concentration, mg/l
Q_{UNC} = Uncontrolled flow, MGD
8.34 = Unit conversion factor.

6.2.4 UNCONTROLLED SOURCES (DOMESTIC, SOME COMMERCIAL, I&I)

As noted above, some sources of pollutant loadings to the POTW are considered uncontrolled. They include domestic users, I&I, storm water, and some or all of a POTW's commercial dischargers. Since the POTW does not control the loadings that these users discharge (except through the general and specific prohibitions in the POTW's sewer use ordinance [SUO]), the POTW needs to subtract their loadings from its MAHLs before it can determine the loadings available for IUs that will be controlled. The POTW should determine the uncontrolled loadings from its local limits monitoring program (see Equation 6.3). Site-specific monitoring of the uncontrolled discharges should be conducted at sewer trunk lines that receive wastewater from only these sources. Concentrations obtained from these locations should be multiplied by the POTW's total uncontrolled flow to determine total loadings from uncontrolled sources.

EPA strongly encourages POTWs to use site-specific data for uncontrolled loadings whenever possible. In Appendix V are data on pollutant concentrations found in typical domestic wastewater discharges, which can be used if site-specific data are not available. Readers should note that domestic wastewater values may not be representative of the uncontrolled discharges in their systems, so these data should be used with extreme care.

A POTW may find that the total uncontrolled loadings of a particular pollutant approach or exceed the MAHL. In these cases, little or no pollutant loading is available for IUs. This situation may arise in part because some of the facilities considered uncontrolled are commercial facilities such as gas stations, radiator repair shops, car washes, or hospitals, which may discharge high levels of pollutants. These facilities may be grouped initially with uncontrolled sources because they are small or have low discharge flows. The POTW may need to carefully evaluate the sources it considers uncontrolled to see if some of them would be better classified as controlled sources with reducible pollutant loadings. Please refer to the *Supplemental Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program* (EPA-W21-4002, May 1991) for typical pollutant loadings for selected commercial industries. This is recommended for POTWs whose allocations to uncontrolled sources consume most or all of its MAHLs for some pollutants.

If a POTW has considerable loadings from I&I and storm water (from combined sewer systems), it should try to estimate their loadings and include them in the uncontrolled loadings subtracted from the MAHLs. The POTW may be able to select sampling locations that include these flows, or it may be able to estimate them by analyzing the variations in flow between periods of wet and dry weather. In some cases, the POTW may be able to decrease the flows and loads from I&I and storm water through sewer system rehabilitation and pollution prevention programs so that loads from these sources do not consume a substantial portion of the POTW's MAHLs.

The POTW may be able to estimate loadings from uncontrolled sources by subtracting loadings of controlled sources from total influent loadings. This method may be useful when most or all of a POTW's data for uncontrolled sources are below detection levels for a pollutant. When the data are mostly below detection levels, the POTW should carefully evaluate how to handle these data because these decisions can affect greatly the loadings available for IUs.

6.2.5 HAULED WASTE

POTWs that do not regulate waste haulers through local limits should determine the loads they receive from hauled waste and subtract these loads from their MAHLs before determining their MAILs. Data on the pollutant concentrations and flows from waste haulers can be collected by sampling hauled waste brought to the treatment works. POTWs should regularly sample these loads to ensure that they are not hazardous waste, do not contain toxic pollutants in amounts greater than expected or greater than local limits, and will not pose risks to the treatment plant or its workers. In addition, POTWs should be aware that hauled waste subject to categorical limitations must meet those limits when accepted at the POTW and that pretreatment standards apply equally to wastes hauled from IUs.

6.2.6 EXPANSION/GROWTH ALLOWANCE

A POTW that anticipates a significant amount of growth in the near future can consider holding in reserve a small portion of its MAHLs for this growth. This expansion/growth allowance is separate from the safety factor. Growth can come from new IUs moving into the POTW's service area or existing IUs expanding their operations, the development of a shopping mall or the opening of other commercial businesses in a new office park, or the construction of a new housing development. The expansion and growth allowance is most commonly justified for BOD, TSS, and other pollutants the POTW was designed to remove. By holding in reserve some of the maximum allowable headworks loading, the POTW has a portion to allocate to the new discharges and may not need to revise its existing IU permits or its sewer use ordinance (SUO). A POTW should annually re-evaluate its local limits, however, so a growth allowance may not be necessary.

6.3 COMPARISON OF MAIL ALLOCATION AND IMPLEMENTATION METHODS

A POTW may select any allocation and implementation method that results in enforceable local limits which prevent pass through and interference and comply with the prohibitions in the federal regulations. The POTW should choose the allocation approach that best fits its own situation. It may choose one approach for some pollutants and another approach for other pollutants, depending on the amount of loading available to IUs and the number of IUs discharging a given pollutant. For example, if only 3 of a POTW's 10 IUs discharge silver, the POTW may prefer to allocate its allowable industrial silver loading among the 3 IUs that discharge silver so that these IUs receive more achievable limits. At the same time, if all of the users discharge copper, the POTW may choose to allocate the MAIL for copper to all of the users on a uniform basis. All regulated IUs should receive at least a background allocation for copper and all other POCs.

The table that follows lists some possible allocation methods and notes the pros and cons of each method. The POTW should consider these issues when determining how to allocate and implement its local limits. Ultimately, the POTW will want to allocate pollutant loadings in a fair and sensible way that does not favor any one industry or group of industries, considers the economic impacts, maintains compliance with the NPDES Permit, and otherwise achieves the environmental goals of the program. The allocation method selected may be subject to State and local public participation requirements in order for the resulting local limits to become legally enforceable.

Table 6-2. Options for Allocating and Implementing Local Limits

Method	Pros	Cons
Allocate MAILs uniformly among all IUs and place uniform concentration limits in the local SUO	-Limits are clear to IUs -Requires little time to calculate limits -Easy to determine compliance	-Need to update SUO when limits change -Inflexible -Limits may be overly stringent since some IUs may get an allocation but do not discharge a pollutant
Place general language about complying with local limits in the local SUO and announce the actual uniform limits outside the SUO	-Do not have to revise the SUO every time local limits change -Easy to monitor for compliance -Relatively easy to calculate limits	-IUs may not be clear on the limits they need to comply with -Limits may be more difficult to enforce
Place general language about complying with local limits in the local SUO and place individual limits in IU permits	-Do not have to revise the SUO every time local limits change -Provides flexibility	-Requires issuing a permit to all IUs that the POTW wants to apply limits to - Limits may be more difficult to enforce
Put MAILs in SUO, allocate loadings on an IU contributory flow or mass proportion basis, and place limits in IU permits	-Only IUs that discharge a pollutant are given a full allocation so limits are more efficiently allocated -Helps avoid setting excessively stringent or unachievable limits	-Requires knowing more about IU discharges (need to know their pollutant content) -Requires updating the SUO when MAILs change -Requires issuing permits to all IUs with specific limits -May penalize IUs that are presently pretreating if others are not - Limits may be more difficult to enforce
Put MAILs in local SUO, allocate loadings on a case-by-case basis to those IUs that need an allocation for a specific pollutant, and place limits in IU permits	-Only IUs that discharge a pollutant are given a full allocation so limits are more efficiently allocated -Helps avoid setting excessively stringent or unachievable limits -Provides flexibility	-Requires knowing more about IU discharges (need to know their pollutant content) and applicable pretreatment systems -More time-consuming to determine allocation -Can lead to an inequitable allocation -Requires updating SUO when MAILs change -Requires issuing permits to all IUs with individual limits - Limits may be more difficult to enforce

6.4 ALLOCATION OF MAILS

A POTW can apply to its controllable sources either concentration-based limits (typically in mg/L), or mass-based limits (typically in lbs/day), or both. *The type of limit depends in part on the method chosen by the POTW to allocate its MAILs among the controlled dischargers.* For example, a POTW that uses the uniform concentration method based on total IU flow typically implements a pollutant limit as a single concentration (generally in its SUO) applicable to all controlled users. If the POTW allocates its MAILs on a case by case basis depending on an IU's need for a certain loading allocation, the POTW may find it easier to apply mass-based limits (in individual permits) that allow for the needed loading at the IU. The POTW needs to consider the enforcability and ability to determine compliance. The POTW should consider the IU's sampling capabilities when determining the type of limits to apply to an IU. An IU may not have flow meters or sampling points necessary to determine its loadings based on the pollutant concentrations measured through its sampling. In these cases, the POTW may instead put concentration-based limits in the IU permits or, potentially, both types of limits in the permit. Thus, the POTW may first allocate its MAILs based on loadings, but then apply the allocations to IUs as concentration-based limits based on flow. POTWs should establish mass limits only for users that have the capability (or are required to develop the capability) to accurately measure their flows at the designated sampling points.

6.4.1 LIMIT DURATION

When applying its local limits, a POTW needs to determine the appropriate limit duration. The POTW may establish limits that are daily maximums, monthly averages, or instantaneous maximums. In general, local limits derived from MAHLs based on long-term criteria should be established as monthly average local limits, while local limits derived from MAHLs based on other criteria should be established as instantaneous or daily limits. Presented below are guidance on these types of limits.

Daily Maximums

In general, the limits developed based on most criteria can be applied as daily maximums. POTWs should generally develop daily maximum limits for all regulated pollutants. For example, MAHLs that are determined by NPDES permit limits expressed as daily maximums should also be considered daily maximums. When the prevention of pass through is based on calculations using Water Quality Standards (or Criteria) the limit should be considered a daily maximum since the calculation is based on either the receiving stream's 1Q10 or 7Q10, both of which are short-term phenomena. Another short-term condition that leads to a daily maximum limit is the MAHL based on biological inhibition for both secondary and tertiary treatment. The residence times for secondary and tertiary treatment is relatively short so any MAHLs associated with them should be considered a daily maximum.

Monthly Averages

A MAHL determined by an NPDES permit limit that was expressed as a monthly average would be considered a monthly average. Sludge inhibition and sludge disposal MAHLs, however, are quite different. Residence times in digesters and storage facilities is commonly 20 to 30 days or more. Consequently, to change the concentration to any appreciable degree. any discharge at the MAHL level would have to be maintained for three to four weeks. This, of course, lends itself to a monthly average type limit. However, if the POTW were to establish an MAHL as a monthly average it would then need to ensure that those conditions sensitive to daily fluctuations are protected by a daily maximum limit. To avoid having to develop two limits the POTW could consider any MAHL based on sludge digestion inhibition or sludge disposal as a daily maximum limit. Any monthly average enforced as a daily maximum would automatically be protective of long term effects.

Instantaneous Maximums

Instantaneous limits should be developed for pollutants that cannot be composited. A limit derived from a MAHL based on 1-hour acute toxicity water quality criteria may not be protective if it is implemented as a maximum daily average instead of as an instantaneous limit. However, if the instantaneous limit is converted to a maximum daily limit using a statistical procedure that accounts for the variation in concentrations over a 24-hour period, the maximum daily limit should be adequately protective. The EPA Technical Support Document (TSD) approach, described in the *Technical Support Document for Water Quality Based Toxics Control* (EPA, 1991a), accounts for these variations. Therefore, if MAHLs based on WQS are developed using the EPA TSD approach, daily maximum and monthly average limits can be obtained from the calculations.

6.4.2 ALLOCATION APPROACHES

A POTW can use several basic approaches to assign limits to its controlled dischargers. As noted above, the POTW can select different allocation methods for different pollutants. Several common approaches for allocating MAILs for conservative pollutants are described in this section. A POTW may choose to use another method as long as it results in local limits that are enforceable and adequately protective. Allocating MAILs for non-conservative pollutants is described at the end of the section.

Uniform Limits For All Controlled Dischargers

This method of allocating MAILs for conservative pollutants yields one limit per pollutant that applies to every controlled discharger.

It requires that the MAIL for each pollutant be divided by the total flow from all controlled dischargers, even those that do not discharge the pollutant. These limits are concentration based (see Equation 6.4).

Equation 6.4: Uniform Concentration Limit Calculation

$$C_{LIM} = \frac{L_{MAIL}}{(Q_{IND})(8.34)}$$

Where:

C_{LIM} = Uniform concentration limit, mg/l
L_{MAIL} = MAIL, lbs/day
Q_{IND} = Total flow from industrial and other controlled sources, MGD
8.34 = Unit conversion factor.

Limits Based on IU Contributions of a Pollutant

Two allocation methods divide the MAILs among only the controlled dischargers that discharge a particular pollutant. These methods develop IU-specific discharge limits. They are:

- **IU contributory flow.** This method is similar to the uniform method described above, except that the MAILs are divided by the flow from only the controlled dischargers that have a pollutant in their discharges at greater than background levels. The concentration-based limits apply only to those users. Any user that discharges at or below the background level is given a background allocation (unless a different allocation can be justified based on actual sample data). This can be calculated for each pollutant using the uncontrolled concentration for that pollutant and the flow of that pollutant from the “non-contributing” industries (see Equation 6.5).

- **Mass proportion.** This method allocates MAILs to each controlled discharger in proportion to the discharger’s loading of that pollutant. To calculate the limits, the ratio of the MAIL to the current headworks loading of a pollutant is multiplied by each controlled discharger’s loading of that pollutant (see Equation 6.6).

If these methods are used, all IUs that are not given a limit for a particular pollutant are held to background levels for that pollutant. Holding the IUs to a background concentration is often implemented incorrectly. It is important to realize that the concept of "background concentrations" should not result in an over-allocation of the MAIL. POTWs should re-check their allocation method, particularly if a uniform concentration is specified in a Sewer Use Ordinance for a background concentration, to prevent an over-allocation error. The mass-based loading calculated using the mass proportion method can be converted to a concentration-based limit using Equation 6.7.

Basis of IU Needs for Discharge Loading/Case-by-Case Basis

A POTW may set IU-specific limits case by case. This type of allocation relies on the POTW's judgment of how much of the MAIL to allocate to each controlled discharger. The limits can be based on the discharger's current loading, its need for a continued loading allocation, its ability to apply pretreatment to achieve certain discharge pollutant levels (i.e., treatability), or any other factor that the POTW determines is relevant. The POTW needs to ensure that the sum of the allocated loadings does not exceed the MAIL and that it provides for at least a background allocation for each pollutant for each user, unless a lower allocation can be justified by sampling data. To ensure that it does not allocate more than the MAIL, the POTW should develop a mechanism that tracks the loading allocated to each IU and compares the total to the MAIL.

Equation 6.5: IU Contributory Flow Calculation

$$C_{LIM} = \frac{L_{MAIL} - L_{BACK}}{(Q_{CONT})(8.34)}$$

Equation 6.6: Mass Proportion Method (1) Calculation

$$L_{ALL_X} = \frac{L_{CURR_X}}{L_{CURR_T}} * L_{MAIL}$$

Equation 6.7: Mass Proportion Method (2)

$$C_{LIM_X} = \frac{L_{ALL_X}}{(Q_X)(8.34)}$$

Calculation

Where:

C_{LIM} =	Concentration limit for all users discharging a pollutant, mg/L
L_{MAIL} =	MAIL, lbs/day
L_{BACK} =	Total background loading allocation for all users for which no contributory flow limit is being established for that pollutant, lbs/day
Q_{CONT} =	Flow from all industrial and other controlled sources discharging the pollutant, MGD
$L_{ALL(x)}$ =	Allowable loading allocated to user x, lbs/day
$L_{CURR(x)}$ =	Current loading from user x, lbs/day
$L_{CURR(t)}$ =	Total current loading to POTW from controlled sources, lbs/day
$C_{LIM(x)}$ =	Discharge limit for user x, mg/l
Q_X =	Discharge flow from user x, MGD
8.34 =	Unit conversion factor

6.5 COMMON SENSE ASSESSMENT

After a POTW has developed and allocated its local limits, it should determine whether they pass a "common sense test." An effective public participation process can help with this assessment, but the POTW should not rely on outside comment to ensure that the proposed final limits make sense. If a POTW implements local limits that are not sensible, its IUs and other controlled dischargers may be asked to meet unreasonable limits, and the POTW may have to enforce a limit that is more stringent than necessary. Some of the questions a POTW should ask to determine if its limits pass the "common sense" test are:

- **Are the limits technologically achievable?** Are IUs and other controlled dischargers likely to meet these limits with currently available forms of pretreatment and pollution prevention (e.g., process modifications)? Remember that local limits are meant to protect the POTW and the environment and therefore are not specifically based on technological achievability.

- **Can the POTW and dischargers determine compliance with the local limits?** Are the limits above sampling method detection levels? If the limits are below the detection level of the most sensitive analytical method, neither the POTW nor the IUs will be able to definitively determine compliance.

- **Are the limits sensible in light of actual conditions at the treatment plant and past compliance experience?** For example, if the POTW is currently violating its NPDES limit for copper but the local limits analysis indicates that the POTW can accept its current influent loading and maintain compliance with that limit, the calculations and the past experience are in conflict, and the POTW should determine the reason(s) for the inconsistency.

If a POTW's calculated limits do not pass the "common sense test," the POTW may need to reassess its limits development process or investigate other options for reducing pollutant loads (e.g., source reduction measures). Besides the environmental criteria used in the calculations, the two pieces of data that can have the greatest impact on the local limits calculations are the removal rates and the uncontrolled pollutant concentrations. A reassessment of the limits development process may show that several of the limits are affected by a lack of data and the use of literature values. By conducting additional sampling (possibly using lower detection limits), a POTW may obtain better data and so be able to calculate more appropriate limits.

Despite the POTW's best efforts to obtain the best data available for the calculations, the local limit calculated for a specific pollutant may at times be unreasonable and warrant other actions to establish valid limits. Other options for reducing pollutant loads to the POTW include:

- Adding other commercial facilities to the set of controlled dischargers and requiring those facilities to reduce the load in their discharges. For example, the POTW's MAHL for silver could be less than the uncontrolled loading resulting in a negative local limit. In this case, it may be appropriate to add other silver dischargers (e.g., photoprocessors) to the group of IUs to be controlled, possibly reducing the uncontrolled loading significantly enough to calculate a reasonable limit.

- Instituting a public education program to reduce problem discharges from domestic and other non-industrial (e.g., dental offices) sources. Some POTWs have worked with area dental associations to help educate dentists about proper disposal practices for mercury amalgam. Other POTWs have held hazardous waste disposal days to reduce the amount of household hazardous wastes discharged into sewers.

- Limiting acceptance of hauled waste to fewer loads, smaller loads, or lower pollutant levels. If hauled wastes contribute significantly to uncontrolled loadings, the POTW may need to stop accepting hauled waste.

- Conducting an I&I reduction program. Although I&I will generally contain lower concentrations of most pollutants than typical domestic sewage, it may contribute loadings that can increase problems with limits calculations.

- Encouraging the replacement of piping that contributes significant loads of copper and iron.

- Carefully examining impurities in chemicals used by industry, POTWs and water suppliers.

A POTW that cannot develop reasonable local limits may need to consider changing sludge disposal methods (if sludge is the limiting factor) or, in the long term, expanding the capacity of its treatment plant, especially for pollutants such as BOD, TSS, or ammonia. In any event, a POTW that is experiencing difficulty developing reasonable limits should contact its Approval Authority to discuss possible solutions.

6.6 APPROVAL AUTHORITY AND ADOPTION PROCESS

A Control Authority's legal authority to impose local limits on industrial and commercial users derives from State law. Therefore, State law must confer the minimum federal legal authority requirements on a Control Authority. Where deficient, State law must be modified to grant the minimum requirements. In order to apply regulatory authority provided by State law, it is generally necessary for the Control Authority to establish local regulations to legally implement and enforce pretreatment requirements. If the Control Authority is a municipality, legal authority is detailed in a SUO,[7] which is usually part of city or county code. Regional Control Authorities frequently adopt similar provisions in the form of "rules and regulations." Likewise, State agencies implementing a State-wide program under 40 CFR 403.10(e) set out pretreatment requirements as State regulations, rather than as a SUO. However, local regulations cannot give the Control Authority greater authority than that provided by State law.

Establishing or revising local limits is considered to be a modification of the POTW's pretreatment program. Therefore, the new or changed local limits must be submitted to the Approval Authority for its review and approval. The POTW must submit a notice to the Approval Authority that states the basis for the modification and must provide a modified program description and other documentation requested by the Approval Authority. After a modification is approved by the Approval Authority, it will be incorporated into the POTW's NPDES permit [40 CFR 403.18(e)].

As specified at 40 CFR 403.18(b)(2), making a local limit less stringent is considered a substantial modification of a POTW's pretreatment program. Not only is the relaxation of a uniform concentration limit considered a substantial modification, but if the MAHL or MAIL also becomes less stringent, the Approval Authority may be required to process the new local limits as a substantial modification as well. For substantial modifications, the Approval Authority must issue a public notice of the request for approval, must provide an opportunity for interested parties to comment or request a public hearing. After deciding whether to approve the modification, the Approval Authority must issue a public notice of approval or disapproval, unless certain conditions are met [40 CFR 403.18(c)(3)].

Non-substantial modifications may be implemented after 45 days, unless the Approval Authority notifies the POTW that a modification is disapproved or determines that the modification is substantial (e.g., would result in an increase in pollutant loadings at the POTW) [40 CFR 403.18(d)]. To be approved, local limits must be made legally enforceable by the POTW. This is generally done by incorporating them in the local SUO. The SUO need not contain local limits already allocated to industries, but at a minimum it should authorize the POTW to establish individual limits through the permits based on the MAIL.

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[7] Consult *Model Pretreatment Ordinance, (EPA 833-B-92-003, June 1992)* for recommended formats for a Sewer Use Ordinance.

The activities described above are regulatory requirements that must be met by all Approval Authorities and POTWs. Approval Authorities may have different procedures for implementing these requirements, and POTWs should check with their Approval Authority for details. In general, however, the approval and adoption process includes the following steps:

(1) The POTW develops or recalculates draft local limits.

(2) The POTW submits the draft new or revised limits and supporting documentation to the Approval Authority for review,[8] makes the proposed new or revised limits available to the public for comment, and provides individual notice to the affected parties.

(3) The Approval Authority notifies the POTW of the "acceptability" of its submission. The submission may be:

- **Not accepted.** The Approval Authority provides comments to the POTW, the POTW addresses the issues raised in the comments and repeats Step 2.

- **Accepted.** The Approval Authority notifies the POTW that its proposed limits have been accepted.

(4) The POTW adopts the new or revised limits, which also are adopted by all the contributing jurisdictions (i.e., all municipalities in the service area). Note that the public must be given the opportunity to review and comment according State and Local law (see discussion on Public Participation below).

(5) The adopted limits become the formal program modification and need to be approved by the Approval Authority (as noted in the above discussion of regulatory requirements). The new or revised limits must be adopted by the POTW and any contributing jurisdictions before the Approval Authority can proceed with public notice and approval.

6.7 PUBLIC PARTICIPATION

Section 101(e) of the CWA establishes public participation as one of the goals in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established by EPA or any State. The General Pretreatment Regulations encourage public participation by requiring public notices or hearings for program approval, removal credits, program modifications, local limits development and modifications, and IUs in significant non-compliance.

POTW pretreatment program approval requests require the Approval Authority (a State or EPA) to publish a notice (including a notice for a public hearing) in a newspaper of general circulation within the

[8]Although POTWs are not required to submit draft limits to their Approval Authority's review prior to formal submission, this step can be helpful in identifying revisions necessary to make limits approvable and can save the POTW (and any contributing jurisdictions) from having to re-adopt revised limits after addressing Approval Authority comments.

jurisdiction served by the POTW. All comments regarding the request as well as any request for a public hearing must be filed with the Approval Authority within the specified comment period, which generally lasts 30 days. The Approval Authority is required to account for all comments received when deciding to approve or deny the submission. The decision is then provided to the POTW and other interested parties, published in the newspaper. All comments received available to the public for inspection and copying.

Once a local pretreatment program is approved, the Control Authority (usually the POTW) must implement that program as approved. Before there is a significant change in the operation of a POTW pretreatment program, a program modification must be initiated. For a substantial program modification, such as the development of new or revised local limits, the Control Authority is required to notify the Approval Authority of the desire to modify its program and the basis for the change. Approval Authorities (or POTWs) also are required to issue public notice of the request for a modification, but are not required to issue public notice of the decision if no comments are received and the request is approved without changes. These changes become effective upon approval by the Approval Authority.

Federal regulations also require POTWs to notify affected persons and groups and give them an opportunity to respond before final promulgation of a local limit [40 CFR 403.5(c)(3)]. While the regulations do not specify the exact public notice process that a POTW should follow, the POTW should conduct public participation in the local limits process as openly as possible. Affected users and other parties that the POTW knows are interested should be notified that the POTW is beginning a detailed reevaluation of its local limits. When new limits are drafted, the IUs and other interested parties should be individually notified of the proposed limits and a public comment period should be announced in the local newspaper. This public comment period can be open while the proposed limits are submitted to the Approval Authority for its initial review, or the POTW can wait until after it receives comments from the Approval Authority. POTWs should allow sufficient time in their limits development process to provide for public participation. A POTW that plans to establish individual limits through the permits issued to users also should provide for public comments in the permit issuance process. During the comment period, the public may present technical challenges to the rationale for a particular local limit. To be adequately prepared to address such challenges, the POTW needs to thoroughly document its limits development process. Similar issues need to be addressed during the re-evaluation process as well (see Exhibit 6-2).

Exhibit 6-2: Local Limits Documentation

Among the items a POTW should keep to document its local limits development process are:

- All data used for determining pollutants of concern and performing calculations.
- Rationale for choosing pollutants of concern.
- Record of calculations (formulas used) and related assumptions.
- Printouts from any spreadsheets or computer programs used.
- Rationale for choosing local limits (comparison of maximum allowable headworks loadings for all applicable criteria, allocation methods and calculations).
- Reasons for not setting limits for particular pollutants or deleting any existing limits.

6.8 Control Mechanisms

POTWs have discretion in selecting the control mechanism through which they will apply local limits to IUs and thereby making them enforceable. Control mechanisms can include a SUO, individual permits, and orders. The choice of control mechanism depends on the type of user (SIU or non-SIU) and on the type of method the POTW uses to allocate its MAHLs among its IUs.

- An SUO alone would not be adequate with any allocation method other than the uniform concentration method. Also, an SUO cannot be used as a control mechanism for SIUs, which must have individual control mechanisms.

- The POTW does not need to allocate its local limits in an SUO, but can instead include MAILs in the SUO and then allocate the loadings in individual control mechanisms. Again, care must be taken to ensure that the sum of each pollutant allocation does not exceed the MAIL.

- Limits based on the contributory flow method can result in over-allocation of the MAIL when uniform concentration values are specified in the SUO for "background concentrations" for SIUs that do not discharge the pollutant. POTWs should ensure that the implementation of the allocation scheme into a control mechanism does not result in an over-allocation of the MAIL.

- An individual control mechanism such as a permit is necessary for most POTW-IU relationships. Even if there is one uniform set of local limits for all IUs, an individual control mechanism is desirable to specify monitoring locations and frequency, special conditions such as solvent management or spill prevention plans, applicable categorical standards, and reporting requirements, and to provide clear notification to IUs (as required by 40 CFR 403.8). As noted above, the POTW is required to issue individual control mechanisms (e.g., permits) to its SIUs. The development of IU permits is discussed in detail in EPA's *Industrial User Permitting Guidance Manual* (EPA, 1989a).

However, in general, once the MAIL is calculated, the POTW has substantial flexibility regarding how to allocate the pollutant load among its IUs as long as a margin of safety is maintained, the POTW has carefully accounted for all allocations, and public notice of the allocation is properly issued and allocation adopted. For example, the Hampton Roads Sanitation District has developed flow-based local limits. Industries are placed in six flow categories (0 to 9,999 gallons per day (gpd), 10,000 to 19,999 gpd, etc.) Uniform limits are applied to each industry within the same flow category. The local limits become progressively more stringent as the industry's discharge flow increases. IUs that discharge above 400,000 gpd are assigned specifically calculated local limits based on domestic loadings and the industrial processes from the specific facility. As an illustration, IUs with a flow of 0 to 10,000 gpd would have a nickel limit of 10.0 mg/L, while those with flow of 200,000 to 400,000 gpd would have daily maximum nickel limit of 1.0 mg/L.

6.9 CONCLUSION

After reviewing Chapter 6, POTWs should understand how to:

- Evaluate the need for local limits after establishing pollutants of concern (POCs);
- Implement local limits;
- Perform a common sense assessment of local limits;
- Provide public participation;
- Gain Approval Authority approval;
- Conduct public outreach; and

- Select the appropriate control mechanism to apply local limits.

CHAPTER 7- LOCAL LIMITS: ANNUAL REVIEWS AND PERIODIC RE-EVALUATIONS

Chapter 7 provides guidance on the annual review and re-evaluations. A POTW reviews its local limits every year when it develops its annual Pretreatment Program Report. This annual review compares current headworks loadings with the maximum allowable headworks loading (MAHL) and examines any recent violations. The annual review is intended as a quick check for any obvious signs that local limits may not be adequately protective. Detailed re-evaluations are undertaken every 5 years as part of a POTW's NPDES permit application. The re-evaluation includes a an in-depth look at all the data, criteria, and assumptions on which local limits are based to determine whether any changes affecting the local limits have occurred.

7.1 ANNUAL LOCAL LIMITS REVIEW

Every year when preparing its Pretreatment Program Annual Report, a POTW should verify that its local limits remain protective of its treatment works, its workers, and the environment. To perform this verification, the POTW should compare its current headworks loadings to its MAHLs and review its compliance history to identify any violations. This review will help ensure that any changes made during the previous year have not weakened the local limits' effectiveness in protecting the POTW from pass through and interference.

7.1.1. COMPARISON OF CURRENT LOADINGS WITH MAHLS

In its annual report to the Approval Authority, a POTW should identify its maximum daily and maximum monthly average headworks loadings during the previous year for each POC for which it calculated a MAHL—regardless of whether a local limit for each POC was adopted. Comparisons of the MAHLs to the headworks loadings are used to determine whether local limits need to be recalculated, or if limits need to be established for additional pollutants. The comparisons also may indicate if there is a need for an investigation into the cause of increased loadings, possibly due to noncompliant IUs.

If the actual headworks loading of a pollutant is greater than a certain threshold percentage of the MAHL, the POTW should revise the local limit for that pollutant, or develop a local limit for it if none exists. For example, a POTW may decide to develop a local limit for any pollutant whose headworks loading is at least 50 percent of the MAHL. EPA recommends threshold values of 60 percent for metals and 80 percent for organics, and conventional pollutants, but a POTW should use threshold values that are consistent with the criteria it used to determine whether a local limit was needed for a POC (as discussed in detail in Chapter 6).

When performing its annual local limits review, a POTW should be on the look-out for the following situations involving pollutants for which no local limits have been set:

- **The current loading of the pollutant at the POTW's headworks exceeds the MAHL.** EPA recommends that the POTW establish a local limit for the pollutant, investigate the cause of elevated loading, increase its IU monitoring, identify any noncomplying industries, and consider undertaking pollution prevention efforts.

- **The current loading exceeds the established threshold value for the first time (i.e., the loading was below the threshold value during the year before).** EPA recommends the POTW increase monitoring for the POC, or establish a local limit for it.

- **The current loading exceeds the established threshold value for the second time.** EPA recommends establishing a local limit and increasing monitoring for the POC.

- **The current loading is below the established threshold.** EPA recommends that the POTW review the pollutant's loading as part of its preparation of next year's annual report.

Similarly, the POTW should prepare to address situations involving pollutants for which local limits have already been established:

- **The current loading of the pollutant exceeds the MAHL.** EPA recommends revising the local limit (unless an investigation reveals that the elevated loading is due to an unusual, one-time event), investigating the cause of the high loading, identifying any noncomplying industries, increasing monitoring of IUs, and considering adopting pollution prevention efforts.

- **The current loading has increased significantly from the previous year (e.g., from 55 percent to 75 percent of the MAHL).** EPA recommends that the POTW investigate the cause of the increased loading, increase its monitoring for the POC, or revise the local limit.

- **The current loading is below the established threshold.** EPA recommends that the POTW review the POC's loading when it prepares next year's report.

As part of its investigation into the cause of an elevated loading, the POTW should determine whether it is an aberration. If the high loading resulted from an unusual, or one-time, occurrence, the POTW may not need to establish or recalculate the local limit for the POC. For example, if the POC load increased as a result of an IU oil spill, the POTW may better address the situation by ensuring that the IU properly implements a spill control plan, rather than by setting or revising a local limit.

When the current loading of one or more POCs approaches the MAHL, the POTW can respond in several ways. It can compare current IU loadings with the MAILs. If the comparison shows that the increased loadings come from domestic or commercial sources, the POTW could educate these sources about pollution prevention, or it could impose local limits on the commercial sources rather than change the IU local limits. If the IU loadings exceed the MAILs, one or more IUs may be violating local limits. Such violations should be found during the POTW's regular review of IU monitoring data.

Another response the POTW can make when current pollutant loadings approach their MAHLs is to review the data used to set the local limits in the first place. If changing conditions have affected the removal efficiencies, flow, or other criteria on which the MAHLs were based, the POTW should recalculate the MAHLs.

7.1.2 REVIEW OF COMPLIANCE HISTORY

As part of its annual review, the POTW should also consider its compliance record over the previous year to determine whether the local limits it has set provide sufficient protection from pass through and interference. If the treatment works has violated its NPDES permit or sludge disposal standards, has caused or contributed to violations of water quality standards in its receiving waters, or has experienced interference of its treatment processes, the POTW's local limits may not be adequately protective. Unless it has identified as the cause of the violation a specific, unusual incident that is unlikely to recur, the POTW should investigate the violation's cause and take appropriate enforcement action against any noncomplying IUs. Alternatively, the POTW should revise the local limit, or establish a local limit if none exists for the pollutants that caused the violations.

7.1.3 NEXT STEPS

POTWs that find further action is necessary after conducting the reviews outlined above can turn to the earlier chapters of this document for guidance on ensuring that local limits remain protective. Chapter 4 has information about monitoring issues, Chapter 5 covers the calculation or recalculation of MAHLs, and Chapter 6 discusses the reallocation of existing MAHLs and other implementation issues, such as control mechanisms and revisions to the POTW's sewer use ordinance.

7.2 DETAILED LOCAL LIMITS RE-EVALUATION

POTWs will need periodically to re-evaluate their local limits to ensure that they remain protective, or to determine whether they should be revised, reallocated, or developed for additional pollutants (see Exhibit 7-1). According to 40 CFR 122.44(j)(2)(ii), NPDES permits must contain a condition to provide a written technical evaluation of the need to revise local limits following permit reissuance. Either the annual or the detailed re-evaluation of local limits can be used to meet this requirement, depending on the conditions at the POTW.

Exhibit 7-1: Why Local Limits Should Be Re-evaluated

Conditions change over time, and these changes may make it necessary to revise some or all of a POTW's local limits. Periodic re-evaluation of its local limits will help the POTW ensure that the limits are effective in protecting the treatment works, its workers, the local collection system, and the environment from the effects of interference and pass through.

As discussed above, POTWs should review their local limits when preparing their annual Pretreatment Program Reports, but that review may not have addressed conditions which can change over time and undermine the effectiveness of local limits. When a POTW needs to address changes in its operating conditions or environmental criteria, data or assumptions used to establish local limits in the first place may no longer be appropriate (See Exhibit 7-2). Examples of these changing conditions are:

- Changes in treatment plant facilities or operations that affect POTW removal efficiencies.

- New IUs discharging to the POTW, or changes in the practices of existing IUs such as increases or modifications to their operations, cessation of discharges or changes in their pretreatment processes.

- Development in the POTW's service area which increases domestic (i.e., uncontrollable) contributions to the POTW.

- Collection of more site-specific data so that assumptions made in the local limits development process can be revised to better reflect actual conditions, or so that data taken from the literature can be replaced with site-specific information.

- Revisions to the POTW's NPDES permit that include additional or more restrictive pollutant limits.

Exhibit 7-2: When to Re-calculate or Develop Local Limits

If you can answer"yes" to any of these questions, your local limits need to be re-evaluated:

- Has the treatment plant been modified, or has a new treatment plant been brought on line?
- Have the treatment plant processes or operation changed in a way that affected the removal efficiencies?
- Has the flow to the treatment plant changed?
- Is the POTW subject to new or revised NPDES limits?
- Have the State water quality standards changed for the receiving water?
- Has the POTW changed, or intend to change, its sludge disposal method? If yes, will this change affect the sludge quality standards that the POTW must meet?
- Have loadings been affected by new IUs discharging to the POTW?
- Have loadings been affected by IUs that have stopped discharging to the POTW?
- Have loadings been affected by changes in discharges from current IUs?
- Are new data available about the POTW or the IUs that invalidate assumptions made during the last local limits development effort?

As these and other changes occur, the POTW will need periodically to undertake a more detailed re-evaluation of its local limits. In addition, if a POTW violates its NPDES permit or sludge requirements, but all of its regulated sources have been maintaining compliance, the POTW should evaluate the adequacy of its local limits to protect the treatment works, its workers, and the environment.

The detailed re-evaluation of local limits is a four-step process:

1. Assess current conditions to determine whether existing MAHLs should be recalculated or reallocated, or additional local limits should be developed. Also determine which pollutants need to be further evaluated and for which criteria. (If only re-allocation of existing MAHLs is needed, skip to step 4.)

2. Based on the pollutants and criteria identified in step 1, determine whether existing data are sufficient. If not, develop and implement a local limits sampling plan, then analyze the data collected.

3. Recalculate the MAHLs of pollutants for which local limits have been developed and determine MAHLs for new pollutants.

4. Implement the local limits. This step may include the reallocation of existing MAILs, if required.

The following sections describe these four steps in more detail.

7.2.1 STEP 1: ASSESS CURRENT CONDITIONS

To determine whether MAHLs should be recalculated, MAILs reallocated, or additional local limits developed, the POTW first will need to compare its current conditions and requirements with those that existed when the local limits were last developed. The treatment works should also evaluate whether a new MAHL is required for a POC, or if the previously determined MAHL remains valid, but needs to be reallocated. To determine which response is appropriate, the POTW should consider the change that led it to re-evaluate its local limits in detail.

Usually, a POTW will undertake a detailed re-evaluation of its local limits in response to one or more significant changes at the treatment works or in the discharges it receives. Recalculating existing MAHLs or determining MAHLs for new POCs is generally an appropriate response to changes in:

- Removal efficiencies
- Total POTW or IU loading
- Limiting criteria (NPDES permits, water quality standards, sludge criteria)
- Sludge characteristics or method of disposal (e.g., percent solids, disposal site life)
- Background concentrations of pollutants in receiving water.

Simply reallocating existing MAHLs may be appropriate when:

- Some IUs need a larger loading allocation and other IUs are not using all of their allocations.

- Total POTW flow is unchanged, but the amount of uncontrollable loading relative to the IU loading has changed.

- Total POTW flow has not changed, but new IUs have come on line while existing IUs have stopped discharging.

In these cases the current MAHLs should still be appropriate, and the POTW can **skip to step 4.**

Some Approval Authorities have worksheets that POTWs can use to determine whether existing local limits need to be recalculated. The worksheets help POTWs compare existing local limits and the data on which they are based with current conditions and applicable environmental and treatment plant criteria. They consider such parameters as POTW and SIU flows; sludge disposal method and associated disposal criteria; occurrence of violations, upsets, and interference; current influent and effluent loadings; water quality criteria; and NPDES permits. *A copy of one of these worksheets and instructions for its use can be found in Appendix X.*

On occasion, a relaxation of local limits may be appropriate. However, the POTW first should demonstrate that the revised local limits will satisfy all of the minimum federal and State requirements and will adequately protect in-stream water quality and sludge quality. If its analysis shows that local limits can be relaxed, the POTW should determine whether their relaxation will result in new or increased IU discharges that will affect the volume or character of POTW influent or effluent. Relaxation of local limits would likely result in a major modification that must be approved by the Approval Authority in accordance with 40 CFR 403.18(b)(2).

7.2.2 STEP 2: COLLECT AND ANALYZE DATA

Properly re-evaluating local limits requires representative monitoring data. If sufficient data are not available, the POTW should develop and implement a sampling plan to provide additional data on relevant POCs. The availability of accurate site-specific data is critical to the development of sound, technically-based local limits. Local limits developed using data from the literature are often conservative.

The data necessary to calculate a MAHL for a new POC may not be available if that pollutant was not part of the POTW's local limits monitoring . Similarly, data collected to support development of a current MAHL may not be valid for recalculating the MAHL if the data were collected before any changes occurred. For example, upgrading a treatment unit may increase removal efficiencies beyond the levels when the POTW conducted most of the sampling for local limits. Consequently, the POTW may need to collect new samples to obtain sufficient data that represent current conditions in order to support the MAHL's recalculation. Chapter 4 covers the data needed to develop local limits.

7.2.3 STEP 3: RECALCULATE EXISTING, OR DETERMINE NEW, MAHLS

If the results of the analyses conducted in steps 1 and 2 warrant, the POTW should recalculate existing MAHLs or determine MAHLs for new POCs. Chapter 5 of this guidance covers MAHL calculations. The POTW should ensure that current data are used for all the variables in the equations for calculating MAHLs.

7.2.4 STEP 4: IMPLEMENT THE LOCAL LIMITS

The evaluation conducted in step 1 may indicate that the MAHL for a POC need not be recalculated, but should be reallocated among the sources of pollutant loadings (IUs, domestic and commercial sources, hauled waste, and any reserve for future growth). In such cases, the POTW will go directly from step 1 to this step.

Implementing local limits may involve:

- Allocating or reallocating MAHLs (between the group of IUs and uncontrollable sources, as well as to individual non-domestic sources).

Exhibit 7-3: An Example of Changing the Method for Allocating Local Limits

Using the uniform allocation method, a POTW gave all of its IUs the same local limit for cadmium through its sewer use ordinance. Since then, an IU changed its operating process and now generates a significant amount of cadmium. If the POTW reallocates cadmium using the same method, the IU may be subject to a local limit that will be difficult for it to meet.

The POTW can change its local limits implementation method by including the MAILs for cadmium in its SUO and allocating cadmium loadings to IUs through individual permits. The new allocations would be based on how much loading each IU discharger needs. In this way, the POTW can provide the IU that changed its operating process with a cadmium allocation sufficient for its needs. This would be considered a "substantial" modification as defined in 40 CFR 403.18(b).

- Public participation.

- Approval of revised local limits (considered either a “non-substantial” or “substantial” modification as defined in 40 CFR 403.18(b).)

- Adoption of local limits and revision of the SUO.

- Revisions of control mechanisms or IU permits.

Implementing new and revised local limits is covered in Chapter 6 of this guidance. Although most of the information presented in Chapter 6 applies to both new and revised local limits, the POTW may have to take additional considerations into account when implementing revised local limits. For example, the POTW may want to use the same allocation method it used previously, but may have a different number of IUs to consider. Or, the POTW may want to use a new allocation method (See Exhibit 7-3). In addition, the POTW does not have to use the same allocation method for every POC, but it should document which method is used for which pollutant and why. If a POTW wants to change its allocation method, it should consider how the change may affect its existing users. If some IUs become subject to more stringent limits, they may need to install pretreatment equipment to remain in compliance with local limits.

7.3 CONCLUSION

After reviewing Chapter 7, POTWs should understand the circumstances that would lead a POTW to conduct an annual review or re-evaluation of the local limits program.

CHAPTER 8- LOCAL LIMITS TO ADDRESS CONCERNS ABOUT COLLECTION SYSTEMS

POTWs may need to develop local limits to address concerns about their collection systems and meet the requirements found at 40 CFR 403.5(b), which include protecting the health and safety of workers at the POTW. Chapter 8 describes methods to address collection system concerns, including:

- Fires and explosions [40 CFR 403.5(b)(1)]
- Corrosion [40 CFR 403.5(b)(2)]
- Flow obstructions [40 CFR 403.5(b)(3)]
- Temperature [40 CFR 403.5(b)(5)]
- Toxic gases, vapors, or fumes [40 CFR 403.5(b)(7)]

POTWs should address each of these potential problems through their local limits development and re-evaluation processes.

8.1 FIRES AND EXPLOSIONS

The General Pretreatment Regulations prohibit the discharge of pollutants that will create a fire or explosion hazard in the POTW. This prohibition includes wastestreams shown to have a closed cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using the test methods specified at 40 CFR 261.21. This provision is intended to protect POTW workers and the POTW collection system. To comply, a POTW can establish a local limit equal to the flashpoint provision, or opt to develop other protection methods. The flashpoint provision and three common alternatives are described below.

8.1.1 FLASHPOINT LIMIT

The flashpoint is the lowest temperature at which vapor combustion will propagate away from its source of ignition. At temperatures below the flashpoint, vapor combustion immediately above the liquid either will not occur, or will occur only at the exact point of ignition. Temperatures above the flashpoint are required for combustion to spread. To protect against fires and explosions, a POTW should prohibit discharges, typically volatile organic compounds, that have a closed cup flashpoint of less than 140°F. (A flashpoint limit applies to the entire wastestream, not to a specific pollutant.)

A flashpoint limit ensures that discharges to a POTW will not combust. It is important to note that a flashpoint prohibition does not necessarily account for the flammability of mixtures from more than one discharger. Dilution effects in sewer systems, however, generally prevent the creation of explosive conditions.

The closed cup is used because this test simulates the confinement of vapors in a sewer. EPA selected a flashpoint of 140°F for several reasons:

- Ambient temperatures in a sewer are not expected to exceed 140°F.
- Typical industrial discharges of wastewater are cooler than 140°F.
- The specified flashpoint is consistent with hazardous waste regulations, which will help ensure that POTWs do not face increased hazardous waste liabilities.

Regulations require that the flashpoint be determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80, or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78, or as determined by an equivalent test method approved by the EPA Administrator under specified procedures. Appendix Y lists closed cup flashpoints for select organic compounds.

8.1.2 Lower Explosive Limit Monitoring

Another way to protect POTW workers is to monitor the collection system for combustible gases. A combustible gas detector measures the concentration of these gases and vapors in the air as a percentage of the lower explosive limit (LEL). The LEL is the minimum concentration in air at which a gas or vapor will explode or burn in the presence of an ignition source.

LEL monitoring measures pollutant concentrations in the headspace above the wastewater, rather than in the wastewater itself, and that makes it difficult to set local limits with this method. Consequently, POTWs often use LEL monitoring to identify potentially problematic discharges, rather than as a numerical limitation to implement and enforce against IUs. LEL monitoring is also an important way to protect POTW workers who enter the collection system.

One approach to monitoring explosion potential is to measure LEL levels at key locations in the collection system. Continuous monitoring at pump stations or key manholes can provide a constant source of data on the potential for an explosion. Many POTWs establish a percentage of the LEL, often 10 percent, rather than the entire LEL as the level of concern. This ensures that discharges are safely below an explosive level.

8.1.3 Sample Headspace Monitoring

Sample headspace monitoring is a discharge screening technique to detect the presence of explosive compounds and toxic gases and vapors. Initial screening using this method can identify discharges that warrant detailed chemical-specific screening.

Sample headspace monitoring involves collecting a wastewater sample using proper volatile organic sampling techniques (i.e., zero headspace), withdrawing a set percentage of the sample, injecting nitrogen gas into the sample container (to maintain a total pressure of one atmosphere) and performing a gas chromatography analysis of the sample headspace gas.

Volatile organic concentrations of the sample headspace gas are converted to an equivalent concentration of hexane and compared to a set hexane limit (usually 300 parts per million of hexane). Concentrations below the limit are usually deemed sufficient to protect the collection system from fires and explosions and to provide minimal protection from toxic gases and vapors. Details of this method are available in *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA/812-B-92-001).

8.1.4 Flammability and Explosivity Discharge Screening Levels

Discharge screening levels can be used to set local limits on the discharge of pollutants that can create flammable or explosive conditions in sewers. This approach requires converting the LELs of individual compounds into corresponding IU discharge screening levels. These levels are then compared with actual IU discharge concentrations. Appendix Z contains a table of discharge screening levels based on explosivity. A variety of screening levels have been developed for limiting flammable and explosive discharges, including the 4-step approach summarized here:

1. Identify the LEL for each POC.

2. Use the following equation to convert the compound's LEL concentration to a vapor phase concentration (C_{VAP}) expressed as mol/m^3. (Ten percent of the LEL often is used in this equation, instead of the full LEL.)

   $$C_{VAP} = LEL \text{ x } P/RT \text{ x } 10$$

   Where:
   P = total pressure, 1 atmosphere (assumed)
   R = ideal gas constant, 0.08206 atm L/mol °K
   T = temperature, 298.15°K (equal to 25°C) (assumed)

3. Determine the Henry's Law Constant (H) for the POC. This constant converts LEL air phase values to corresponding water phase discharge levels. Note that H is presented in a variety of units [e.g., (atm m^3)/(mol), (mol/m^3)/(mg/L), and (mg/m^3)/(mg/L)] and may require converting H into the appropriate units of (mol/m^3)/(mg/L).

4. Calculate the IU discharge screening level (C_{LVL}) using the Henry's Law expression:

   $$C_{LVL} = C_{VAP}/H$$

   Where C_{LVL} is the discharge screening level in mg/L.

Screening levels derived by this method should be compared directly with the actual IU discharge concentrations. Some of the assumptions made using this method are:

- Although temperature dependent, H typically is reported at 25°C (77°F), which is a reasonable estimated temperature of discharges to POTWs. Hotter wastewaters will exhibit concentrations in the vapor phase, while cooler wastewaters will exhibit more the pollutant in the liquid phase.

- The pollutant instantly volatizes to the sewer atmosphere. Although this is a conservative assumption, the more turbulence in the sewer, the closer the assumption is to actual conditions. In addition, air flow through the sewers prevents the reaching of equilibrium, thereby acting to reduce concentrations below threshold levels in the vapor phase.

- The equation does not take into account the solubility effects that result from organic contaminants in the wastewater, thereby limiting volatilization into the atmosphere.

For details of this method, see *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors (EPA 812-B-92-001)*.

8.2 CORROSION

The General Pretreatment Regulations prohibit discharges of pollutants that will cause corrosive structural damage to a POTW—and discharges with a pH lower than 5.0—unless the works is specifically designed to accommodate such discharges.

8.2.1 PH

Besides the low-end pH limit specified in the General Pretreatment Regulations, POTWs should evaluate the need to set upper pH limits or more stringent low-end pH limits. A POTW should set an upper pH limit if corrosion damage attributable to high-pH discharges is identified. Wastewater of pH 12.5 or higher is considered a hazardous waste (exhibiting the characteristic of corrosivity) under 40 CFR 261.22(a)(1), so pH 12.5 may be an appropriate upper limit in lieu of any identified high pH corrosion concerns. EPA is evaluating the specific prohibition for pH and may clarify the applicability of this limitation to industrial discharges. (This clarification may include guidance on implementing pH limits.)

8.2.2 CORROSIVE POLLUTANTS

In addition to discharges whose pH is high or low, the following pollutants can contribute to the corrosive properties of wastewater:

- **Sulfides and sulfates.** Much of the sulfides in collection systems are present as hydrogen sulfide due to the anaerobic degradation of sulfates. This degradation occurs where oxygen is absent and organic matter is present. Collection systems are particularly conducive to this reaction if wastewater is allowed to stagnate. The formation of hydrogen sulfide is primarily a function of the collection system's design, however, not a function of the characteristics of industrial discharges. Hydrogen sulfide corrodes metals such as iron, copper, lead, and zinc. It is also a precursor to sulfuric acid, which corrodes concrete and metals. Sulfates cause corrosion by reacting with the calcium in concrete to form calcium sulfate, which can cause concrete to crack. For more information, see *Detection, Control, and Correction of Hydrogen Sulfide Corrosion in Existing Wastewater System*, EPA-832-R92-001, September 1992.

- **Chlorides.** This pollutant can adversely affect inorganic films and precipitates that form on sewer walls. Not only can chlorides decay and penetrate these coatings, it can also prevent them from developing by forming more soluble metal chlorides instead.

- **Chlorine.** By reacting to form hydrochloric (HCl) and hypochlorous (HOCl) acids that decrease the pH of wastewater, chlorine can increase the rate at which iron and steel corrode.

- **Nitrates and nitrites.** They can contribute to iron and steel corrosion through preferential reduction at cathodic areas.

- **Dissolved salts.** The electrolytic action of dissolved salts on the base material can corrode concrete, asbestos-cement, and cement mortar.

- **Suspended solids.** The abrasive and erosive contact of suspended solids with sewer pipes and pumps can cause corrosion, particularly at joints, elbows, bends, and other non-uniform areas.

- **Organic compounds.** If present in excessive concentrations, organic compounds such as solvents will promote the dissolution of gaskets and rubber and plastic linings.

8.3 FLOW OBSTRUCTIONS

The discharge of solid or viscous pollutants in amounts that will obstruct flows to POTWs and result in interference is prohibited by the General Pretreatment Regulations. *The greatest threat of obstruction in POTWs comes from fats, oils, and greases (FOG) of animal and vegetable origin.* Typical sources include restaurants, residences, food processors, and food-based industries.

Although more compatible with wastewater treatment operations than mineral- or petroleum-based oil and grease is, FOG can accumulate and congeal- in collection systems, pumping stations, and treatment plants. By obstructing influent flows, FOG reduces the capacity of pipes and pumps, interferes with POTW instruments such as flow meters and probes, reduces treatment efficiency, and increases POTW operation and maintenance costs. Additional discussions on FOG are provided in Section 5.3.3.

Local limits on FOG may require that the POTW investigate and monitor the activities of non-SIUs that are the sources of FOG. The use of controls other than numerical limitations may be a more appropriate way to address the problem of FOG from non-SIUs. These controls can include requirements to install and maintain grease traps; pretreatment requirements; best management practices; prohibitions of specific materials, such as free-floating FOG; prohibitions of FOG that are in a solid or semisolid form; surcharge programs; cost recovery efforts to defray the expenses associated with cleaning sewers; and pollution prevention measures. Many POTWs have oil and grease control programs. One useful source of information about animal and vegetable-based FOG pollution prevention techniques is the document *Fats, Oil, and Grease Best Management Practices Manual, Information, Pollution Prevention, and Compliance Information for Publicly-Owned Treatment Plants,* produced by Brown and Caldwell for the Oregon Association of Clean Water Agencies. The document can be viewed and downloaded from the Oregon Association of Clean Water Agencies ORACWA web site (www.oracwa.org/).

8.4 TEMPERATURE

Heat discharges that will inhibit biological activity in a POTW and result in interference are prohibited by the General Pretreatment Regulations. And in no case can discharges increase the temperature at the POTW headworks above 40°C (104°F) unless the Approval Authority, upon request of the POTW, approves alternative temperature limits.

The dilution of heated industrial wastewaters in the collection system typically ensures compliance with this prohibition. Temperature is generally more of a hazard to workers who must enter the sewer system than it is to POTW treatment operations. A POTW that encounters IU discharges hot enough to prevent or restrict sewer entry should require the IU to reduce the temperature of its discharge. The installation of heat exchangers on high-temperature discharges may help the IU save on heating costs for its facility or its process streams.

8.5 TOXIC GASES, VAPORS, AND FUMES

The General Pretreatment Regulations prohibit the discharge of pollutants that lead to the accumulation of toxic gases, vapors, or fumes in the POTW in sufficient quantity to cause acute worker health and safety problems.

Discharge screening levels can be developed to identify IU discharges that have the potential to generate toxic gases or vapors in the sewer. A common approach is to convert gas and vapor toxicity criteria for individual compounds into corresponding IU discharge screening levels using Henry's Law Constants. These constants relate the concentration of a constituent in the air to the corresponding equilibrium concentration in the water. The screening levels should be compared to the actual pollutant concentrations in the IU discharge. Calculating these wastewater screening levels is a three-step process:

- Identify the toxicity criteria, also known as the threshold concentration (C_{VAP}, in mg/m^3), for the POC. Typical threshold values are available from the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), and the American Conference of Governmental Industrial Hygienists (ACGIH). Each organization can provide chronic and acute exposure thresholds that can be used to develop screening levels.

  Consistent with the specific prohibitions for toxic gases, vapors, and fumes, screening levels may be based most appropriately on acute worker health and safety levels. These include ACGIH Short-term Exposure Levels (STELs), NIOSH Immediately Dangerous to Life or Health (IDLH), and OSHA acceptable ceiling or maximum concentrations. Several threshold values for potential POCs are available in the appendices of this guidance.

- Identify the Henry's Law Constant (H) for the POC and convert the constant to the appropriate units of (mg/m^3)/(mg/L).

- Calculate the IU discharge screening level (CLVL) from the Henry's Law expression:

$$C_{LVL} = C_{VAP}/H$$

Where:
C_{LVL} = IU discharge screening level (in mg/L)
C_{VAP} = Threshold concentration (in mg/m^3)

As with the flammability and explosivity screening level, this screening method assumes instantaneous volatilization of the pollutants to the atmosphere and does not consider the dilution of IU wastewater in the collection system. Therefore, these screening levels will in many cases be more conservative than necessary to protect POTW workers.

These screening levels address only the toxicities of individual compounds, but mixtures of toxic compounds can be evaluated against an adjusted threshold value of the mixture of all the toxic compounds. Appendix Y contains a table of discharge screening levels based on fume toxicity. Details on the specifics of using the discharge screening level method, including evaluating mixtures of toxic gases, vapors, or fumes, is available in EPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors (EPA 812-B-92-001)*.

8.6 CONCLUSION

After reviewing Chapter 8, POTWs should be able to address collection system concerns: fire and explosions, corrosion, flow obstructions, temperature, and toxic gas, vapors and fumes.

CHAPTER 9 - QUESTIONS AND ANSWERS

This chapter presents EPA's responses to many commonly asked questions about local limits development and implementation. The questions and answers are grouped by topic for ease of finding subjects of interest.

9.1 GENERAL

Q: Once I establish a local limit, will I ever be able to drop it?

A: *As emphasized throughout this guidance, development of local limits is a continuing, dynamic process. A re-evaluation of specific local limits whenever there are significant changes in the overall program is something that every prudent Control Authority should do on a regular basis. If changes in IU discharge conditions or installed treatment technologies at the POTW dictate that some pollutants of concern (POCs) are no longer present or present in concentrations that will not cause pass through, interference, or degradation of sludge quality, then the local limits for those pollutants may be dropped after appropriate procedures are taken. However, POTWs should be cautioned that dropping a particular local limit completely may motivate IUs to discontinue a treatment process designed to remove or recycle that particular pollutant. POTWs should have a complete understanding of the makeup of untreated IU wastestreams before dropping a local limit completely. The regulations at 40 CFR 403.18(c)(3) specify that eliminating or changing a local limit to make it less stringent requires notification of the Approval Authority and appropriate public notice because such actions are considered substantial program modifications.*

Q: How do inter-jurisdictional agreements affect local limit requirements?

A: *For inter-jurisdictional agreements in which one Control Authority accepts industrial wastes from one or more other, independent municipalities, EPA strongly recommends that all contributing jurisdictions adopt a set of local limits that are at least as stringent as those of the Control Authority which maintains the collection system and operates the receiving POTW. If this policy is impractical, then the contributing jurisdictions should agree to a maximum total mass loading of pollutants that would be discharged to the primary collection system and POTW. As an alternative, the contributing jurisdiction may adopt two sets of local limits and apply to each IU the limit appropriate to the treatment works to which the user discharges. Consult EPA's* Multi jurisdictional Pretreatment Programs Guidance Manual *(EPA 833-B-94-005, June 1994) for additional information.*

Q: Do a minimum number of parameters need to be evaluated?

A: *There is no minimum number of parameters required by regulation. In its 1985 report, the Pretreatment Implementation Review Task Force, which consisted of representatives from*

POTWs, industries, environmental groups, States and EPA Regions, noted that "defensible local limits are the cornerstone of an effective POTW Pretreatment program." All POTWs must determine the maximum loading that can be accepted by a treatment facility without pass through, interference, or sludge contamination. An EPA policy memorandum (dated August 5, 1985) stated that a technical evaluation for POCs by every POTW should include a determination of the need for limits for cadmium, chromium, copper, lead, nickel, and zinc. The previous Local Limits guidance (1987) expanded that list to a total of 10 toxic metals by including mercury, arsenic, silver, and cyanide. Based on widespread reports of problems at POTWs over the intervening years, this Guidance will add total suspended solids, 5-day biochemical oxygen demand, ammonia, molybdenum and selenium to the list of recommended minimum pollutants to be considered as POCs.

Q: Do local limits have to be developed individually for multiple treatment works? Is it necessary that identical numeric local limits be established?

A: Although there is no regulatory requirement that a Control Authority (CA) develop local limits that are specific to a single treatment works, it is recommended that the CA perform a separate evaluation for each works to determine if each plant is being protective and not subject to pass through or interference problems. After completing these independent evaluations, the CA can determine whether individual local limits should be provided to the IUs that discharge into the parts of the system served by a particular treatment works. The only regulatory requirement is that there be local limits developed that are enforceable on a technical basis. The preferred method is to establish MAILs individually for the treatment plants, but if that is politically infeasible, then set a single, conservative local limit (i.e., the lowest limit developed in the assessment for the individual treatment works) for a POC. The limit should then apply to all IUs that discharge to the POTW, without regard as to which works actually treats the wastewater discharged by a particular IU.

Q: Can BMPs and BPJ limits be applied in lieu of the traditionally derived numeric local limits?

A: The General Pretreatment Regulations do not specifically address the use of best management practices (BMPs) and best professional judgment (BPJ) as local limits. The regulations at 40 CFR 403.5 (c) require the POTW only to develop "specific limits" for prohibited discharges. The current regulatory language is ambiguous as to whether BMPs could serve in lieu of numeric limits. BMPs may reduce the amount of the POC at the headworks thus leaving more to be distributed as numerical limits to facilities that cannot control their discharge through BMPs. If adopted, the proposed Pretreatment Streamlining rule would specify that BMPs could be considered as local limits and also fulfill the statutory requirements of section 307 (d) of the Clean Water Act. As with BMPs, using BPJ to develop local limits is not specifically prohibited. If adopted following the process in 40 CFR 403.5, BPJs are enforceable.

9.2 POTENTIAL POLLUTANTS OF CONCERN

Q: If a pollutant is below the detection level in influent, effluent, and sludge, can a POTW exclude it as a POC (and not develop a MAHL), even if it is one of EPA's 15 pollutants?

A: Yes, it can. The fact that a POC is not detected in the influent, effluent, or sludge when the POTW is assessing the need for local limits precludes an accurate calculation of the MAHL for that particular pollutant. The goal of setting stringent local limits is to protect the POTW and avoid violations of its NPDES permit. However, if no MAHL is established for a "potential" POC, there is always the possibility that a new industrial user (or users) of the system will discharge wastes that are in excess of the POTW's ability or capacity to treat such wastes. Therefore, EPA recommends that MAHLs be developed for all 15 EPA-designated POCs even if local limits are not adopted. Of course, POTWs should assess a new user's impact on local limits before granting authorization to discharge.

Q: Should local limits be developed as dissolved metals, total metals, or both? How does hexavalent chromium relate to total chromium, and which should be used for local limits development?

A: While it may be desirable to develop local limits for both dissolved and total metals, in reality it is impractical because of cost. City data are almost exclusively in terms of "total" because of NPDES requirements and the fact that Categorical Pretreatment Standards are always expressed as total. Since the POTW should be able to apply the more stringent of either the local limit or the Categorical Standard, it makes sense to develop the local limits as "total" values. Although the dissolved form of metals is usually more toxic, POTWs need to control the total metal entering the treatment works because particulate metal or metal compounds may exert some toxicity or may later be resolubilized. A large percentage of the toxic metals present in aeration basins at some treatment works has come from recycled solids handling sidestreams. These contributions can continue to exert a toxic effect long after the source has been controlled. Although most heavy metals "passing through" a treatment works are discharged into receiving waters in the dissolved form, significant concentrations of heavy metals may accumulate as fine particulates in the sludge produced at the works. By implementing local limits to control <u>total</u> metal concentrations, a POTW will reduce the chances for pass through and ensure that the quality of the sludge is not degraded. Local limits should be developed for total chromium. Hexavalent chromium is the more toxic of the two forms of the metal, but it can be converted to a total chromium value by using proper mathematical equations (see Appendix S). If a POTW has contributions of hexavalent chromium, it should develop local limits for both hexavalent chromium and total chromium. The basis of the limits will likely be different because the allowable holding time for hexavalent chromium samples is less than 24 hours.

9.3 SAMPLING AND ANALYSIS

Q: What analytical requirements and quality assurance/quality control procedures apply to local limits evaluation sampling?

A: There are no different or "special" quality assurance/quality control procedures that apply strictly to local limits sampling. All wastewater sampling for POCs should follow prescribed *protocols found in 40 CFR Part 136 (*Guidelines for Establishing Test Procedures for the Analysis of Pollutants*) and information provided in EPA-issued technical guidance. When sampling sludge for metals and total solids, however, the requirements in the sludge regulations at 40 CFR Part 503 apply. The analysis of sludge for the presence of metals should be performed according to EPA test method SW-846 and for total solids according to Part 2540 G of the Standard Methods for the Examination of Water and Wastewater, 18th Edition.*

Q: Are there minimum analytical detection levels that should be achieved when analyzing samples for local limits?

A: As discussed in Chapter 4, a POTW's NPDES permit conditions, sludge disposal practices, and State and local requirements need to be addressed through local limits. Therefore, the analytical techniques for detecting POCs need to be able to identify and quantify concentration levels that are at least as stringent as the prescribed maximum concentrations for conventional and non-conventional pollutant effluent limitations, water quality-based toxic pollutant limitations, whole effluent toxicity (WET) requirements, and any numeric criteria for sludge use and disposal practices. In addition, POTWs should specify the lowest reasonable concentration for a local limit to minimize the possibility of a POC being reported as"non-detectable."

Q: Is it necessary to account for hydraulic detention time through the treatment works when conducting sampling?

A: Treatment works sampling should account for hydraulic detention times within the plant whenever possible. Developing relevant removal efficiencies depends in part on accounting for hydraulic detention times. For some systems, such as lagoon systems, hydraulic detention times may be lengthy (e.g., 21 days). If it is not feasible to account for detention times, local limits can still be developed, but the options for determining removal rates will be reduced.

Q: Do I have to outline a data collection plan for the local limits evaluation?

A: Outlining a data collection plan for local limits evaluation is not required by 403 regulations, although some Approval Authorities may require submission of such a plan. However, EPA highly recommends that a POTW develop a monitoring program to ensure that it has adequate data for developing local limits that have sound technical bases. A program can also enable a POTW to use fewer resources to evaluate local limits by providing the data necessary to determine and justify that local limits are not necessary for some pollutants and by enabling the POTW to manage its data and ensure that unnecessary sampling is not performed.

Q: Is sampling and analysis of the receiving stream necessary?

A: Receiving stream data (flow and ambient background concentrations of pollutants) provide key input parameters for allowable headworks loading (AHL) calculations when NPDES permit limits do not exist and the POTW needs to evaluate for pass through based on water quality standards. These data may already be available from sources such as the U.S. Geological Survey, State environmental agencies, and in the POTW's NPDES permit. Therefore, a POTW may not need to conduct sampling and analysis of the receiving stream to gather these values. However, if these data are not available the POTW should consider monitoring the receiving *water so that AHLs can be calculated based on applicable values. The Approval Authority may require this information on a case-by-case basis for individual IUs. Other dischargers to the same portion of the receiving stream may already have performed monitoring and may be willing to share the data or the costs of new monitoring.*

9.4 DETERMINING MAHLS

Q: Water quality standards have been established for our treatment works' receiving waters, but no water quality-based effluent limitations are included in our permit. Is it necessary to include the analysis for an allowable headworks loading (AHL) based on water quality standards in this case?

A: Yes, it is. If a POC concentration measured at the headworks exceeds a MAHL that was set by the AHL for a water quality standard, there will be pass through of the pollutant, thereby causing a violation of the water quality standard and (consequently) of the Clean Water Act. In general, POTWs will not have NPDES permit limits for all of the POCs established during the local limits analysis. In such cases, a POTW should base its effluent-quality-based AHL on State Water Quality Standards (WQS) or federal Water Quality Criteria (WQC). State environmental agencies have developed WQS that set maximum allowable pollutant levels for their water bodies, specific to the receiving stream reach's designated uses. Even though the POTW's NPDES permit may not contain a numeric effluent limit for a POC, the permit should contain narrative provisions requiring compliance with State WQS and prohibiting the discharge of any toxic pollutants in toxic amounts. A local limit based on a State WQS fulfills the narrative permit requirement specifying "no discharge of toxics in toxic amounts."

Q: How much literature data is acceptable in deriving MAHLs? How much site-specific data is sufficient? How recent must data be for deriving MAHLs?

A: The answers to these questions will vary significantly from facility to facility. Depending on what the POC is and on the type and accuracy of the data available, there is a considerable range of acceptable techniques for deriving the MAHL. The Control Authority should make a case-by-case determination as to what type and age of data are sufficient to calculate accurate, technically defensible MAHLs. However, the most accurate and technically defensible limits are the result of using site-specific data, rather than "generic" removal efficiency data derived from average, national-level treatment works "literature" data.

Q: We do not have NPDES or sludge limits for all of the POCs required to be evaluated; further, there are no State WQS for these pollutants. What criteria are we supposed to use in our evaluation?

A: Sludge, NPDES, or water quality criteria may not exist for all POCs. In these instances, the POTW should try to develop MAHLs based on system design criteria, air quality standards, inhibition criteria, or worker health and safety standards. In addition, the POTW needs to go back and establish why the POC was added in the first place (e.g. wet test failure) and establish criteria through researching other applicable standards and guidelines.

Q: How does a POTW develop local limits based on a NPDES WET limit?

A: *Nothing in the pretreatment regulations prohibit using Whole Effluent Toxicity (WET) test data as the basis for developing a local limit. WET tests are primarily designed to protect the receiving waters from the aggregate toxic effect of a mixture of pollutants in the effluent. The WET approach is most useful for complex effluents where it may be infeasible to identify and regulate all toxic pollutants in the discharge, or where chemical-specific pollutants are set, but synergistic effects are a problem. However,* <u>*unless*</u> *you can identify each compound in the effluent that produces measurable acute or chronic toxicity concentrations, WET testing cannot be used to set local limits for a particular POC. If the toxic pollutant or pollutant parameter cannot be identified, then all of the possible POCs present in the mixture have to be evaluated. In this situation, WET test data may not be a cost-effective methodology for identifying POCs for evaluation in the local limits development process. You should consult the guidance* Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants *(EPA/833-B-99-002, August 1999) for further information on conducting a Toxicity Identification Evaluation (TIE). (This guidance can be downloaded from http://www.epa.gov/owmitnet/pdfs/tre.pdf.)*

Q: Influent and effluent pollutant concentrations are below detectable levels yet the pollutant is detected in the sludge. What removal rate should I use?

A: *A POTW should first evaluate those levels below the detection limit as outlined in section 5.1.3. If the methodologies outlined in section 5.1.3 do not allow the calculation of a removal rate, a POTW can selectively use removal efficiencies reported by other POTWs or by studies that have been published in professional journals or by EPA. Appendix Q provides a list of removal efficiency data for priority pollutants gathered from other POTWs. literature values.*

Q: Why should POTWs use the Table 3 Land Application Part 503 sludge standards when the POTW's sludge is disposed of in a landfill?

A: *POTWs should use the Table 3 standards because the Pretreatment Regulations list recycling of sludge as one of the goals of the program. Land application standards help meet this goal and also allow for more sludge disposal options, since the Table 3 standards are the most stringent. Additionally, until a sludge landfill is properly closed and abandoned there is always a potential for the leachate to affect groundwater. Please see Appendix W for landfill leachate loadings. In some cases, collected leachate can be trucked (as hauled waste) to a POTW and treated down to non-toxic concentration levels. For this option to be viable, the metals content of the sludge should be limited to concentrations that will not cause potential pass through or interference problems for the POTW. Table 3 sludge standards for land application cover all nine toxic metals, while the landfill sludge standards specify limits only for arsenic, chromium and nickel. Imposing Land Application standards on sludge increases the probability that the leachate can be successfully treated in the future at a POTW. Nevertheless, if a POTW has a choice of disposal options, EPA recommends that it use land application disposal techniques because they are generally more controllable and have less potential for serious environmental degradation of surface water and ground water.*

9.5 ESTABLISHING LOCAL LIMITS

Q: All of my influent, effluent, and sludge concentration data for a specific pollutant are below detectable levels. Can the pollutant still be considered a POC and local limits established?

A: *Yes. The Control Authority (generally, the POTW) has the authority to consider any chemical compound or pollutant as a potential POC and establish a local limit for that pollutant. You should calculate an AHL for each of the 15 POCs that EPA believes are commonly found at most POTWs. Moreover, if your POTW serves a high-growth municipality or incorporated area where the number and type of non-domestic users change frequently, it is probably prudent to establish a MAHL limit in your ordinances for any pollutant that could potentially cause interference, pass through, or degrade your sludge quality—even if the concentration of that pollutant is currently below detection levels. Several statistical approaches to evaluating "below detection level" data are discussed in the main guidance document and the Appendices.*

Q: What do I do when my total domestic/background loading of a pollutant is equal to or greater than my MAHL, so I have no allowable loading for IUs?

A: *The POTW should undertake a program that involves short-term, intermediate, and long-term measures. Short-term measures include evaluating the data and calculations used to develop the local limits to assess the validity of results. Intermediate measures include establishing interim local limits, looking into other possible sources of pollutants (including expansion of your list of IUs), and determining how to manage these sources. Long-term measures involve evaluating controls for users not already covered by your pretreatment program. If the short-term measures do not take care of the problem and provide loadings to allocate to IUs, the POTW would proceed to intermediate measures, and then, if necessary, long-term measures. Examples of activities for each of the steps are:*

Short-term

- *Ensure that all significant industrial and commercial dischargers of the pollutants have been identified.*
- *Use actual sewer trunk line monitoring data in place of any literature data used in determining total domestic pollutant loadings to the POTW.*
- *Use removal efficiencies based on in-plant monitoring in place of any literature removal efficiencies used in determining MAHLs.*
- *Verify the applicability of criteria (e.g., sludge disposal standards, water quality criteria) used as the basis for AHL calculations.*
- *Verify that appropriate sampling locations have been used, and that samples are representative (i.e., do not reflect peak loading periods only).*
- *Check the accuracy of all calculations made and the reliability of data used.*
- *Evaluate how non-detect monitoring results were handled (e.g., equal to the detection level was used) and consider using other conventions (e.g., half the detection level).*
- *If the MAHL is based on inhibition criteria, current headworks loadings are greater than the inhibition criteria and the POTW has not experienced inhibition, the current loadings may be a more appropriate basis for inhibition values.*

Intermediate

- *Verify the sampling frequency through statistical methods.*
- *Collect additional sampling data to refine values used (e.g., for removal efficiencies) or replace literature values.*

- *If hauled waste is being accepted, consider discontinuing this practice or instituting a program to determine individual waste water components versus those contained in the septage.*
- *If chemicals are added in the plant or sewer system (e.g., to control root growth), consider alternatives which may not affect the pollutants with loadings of concern.*
- *Calculate a mass balance for the collection system (i.e., check if the sum of industrial plus domestic/commercial plus any hauled waste loadings, etc. are between 80 percent and 120 percent of the total influent loading)—if not, one or more sources may not be accounted for or data may be invalid.*
- *Establish interim local limits such as a local limit equal to the POTW's NPDES permit limit, to the NPDES limit adjusted for the POTW removal efficiency for a* particular *pollutant, or to the lowest achievable method detection level (so that IU compliance with the limit can be determined). If the POTW is not experiencing pass through or interference for a given pollutant (e.g., no NPDES limit or sludge disposal criterion violations, no collection system problems), consider substituting the current influent loading in place of the MAHL and recalculate the allowable industrial loading. The interim limits should be replaced as long-term measures take effect.*

Long-term
- *Require industries to perform pollutant minimization/prevention evaluations.*
- *Consider implementing measures to address or regulate elevated loadings from non-industrial sources. These non-industrial sources include nonpoint sources (e.g., runoff) discharging to combined sewers, elevated pollutant levels in water supplies, household disposal of chemicals into sanitary sewers, and toxic pollutant discharges from commercial sources (e.g., photo labs or dry cleaners).*

Pollution prevention/minimization programs can address each of these sources. Nonpoint sources of pollutants may be addressed through combined sewer overflow control programs and urban and agricultural chemical management programs. The POTW may be able to reduce elevated pollutant levels in water supplies by working with the local water department. For example, elevated levels of metals in water supplies often arise from leaching in water distribution pipes. The local water department may be able to reduce leaching by adjusting the pH of the water supply. In this case, the POTW may be able to assist the water company in developing a program to optimize the use of chemical additives in lieu of making simply adjustments to the pH by using acidic or caustic chemical agents. The POTW can make efforts to educate the public about how to properly dispose of household chemicals and to provide chemical and used-oil recovery facilities. Each of these efforts is not directly part of the local limits process.

Reducing toxic pollutant discharges from commercial facilities is generally most effectively addressed through local limits. Commercial sources of pollutants, such as radiator shops, car washes, hospitals, laundries and photo processors are often not considered significant sources of toxics because they typically have relatively low flows or are assumed to have insignificant pollutant levels in their discharges. However, these commercial sources may discharge at surprisingly high pollutant loading levels and are potential IUs that should be considered for control during local limits development. In some cases, the POTW may best address these sources through pollution prevention/minimization efforts, such as providing guidance to small *commercial dischargers (e.g., informing dentists about how they can reduce mercury discharges to sewers).*

Q: How useful are priority pollutant data in determining the need for and in setting local limits?

A: The "best case scenario" is that a POTW knows everything about each of its IUs, including the manufacturing processes involved and the types and amounts of pollutants discharged into the collection system by a particular facility. However, despite the requirements to notify the POTW of any changed discharges, some facilities might install new process technology, change to the production of new chemical compounds, or use new or substitute chemicals in their processes. In these cases, new POCs might be introduced into the POTW. Use of priority pollutant scan data would provide added insurance that none of the 126 priority pollutants are being introduced (inadvertently or otherwise) into a POTW before problems with pass through, interference or sludge quality are detected by other analytical means.

Q: Do local limits apply to all IUs? Do they have to be included in all permits issued by the POTW?

A: The assignment of local limits depends on how the MAIL calculations were performed and how the sewer use ordinance requires the local limits to be implemented.
There is no regulatory requirement that "all limits" be included in every permit. However, the regulations at 40 CFR 403.8(f)(1) require that "the contribution to the POTW by each Industrial User be 'controlled' through permit, order, or similar means, to ensure compliance with applicable Pretreatment Standards and Requirements." The regulations also specify that permits issued to Significant Industrial Users (SIUs) must contain certain minimum conditions, which include: "Effluent limits based on applicable general pretreatment standards in part 403 of this chapter, categorical pretreatment standards, local limits, and State and local law." [403.8(f)(1)(iii)(C)]

The applicability issue is determined by the local limit allocation method (uniform concentration, mass proportion, industrial contributory) which the POTW chooses when developing the local limits and how the POTW expressly states the applicability of the local limits within its sewer use ordinance (SUO). The Control Authority may elect to codify local limits in the local SUO or place general enabling authority language about local limits in the SUO and announce the actual limits (as a technical directive, etc.) outside of the SUO. Including the limits in the SIU permit provides individual notice to a permittee of which pollutant limits are applicable to that particular SIU.

Q: My local limits re-evaluation indicates that a less stringent local limit than the one currently in the ordinance can be applied. Is this allowed in light of EPA's anti-backsliding policy?

A: First, you need to consider the full meaning of the "anti-backsliding" policy. The "anti-backsliding" concept associated with NPDES permit limits does not apply to local limits. Local limits apply to a particular IU and can be raised or lowered based on the periodic re-evaluation of the need for those limits. Second, a POTW may need to modify its SUO before it may impose a less stringent limit. Otherwise, the permit may conflict with the POTW's authority. Third, in the case of a Categorical Industrial User discharge regulated by a categorical effluent standard, the more stringent limit <u>*must*</u> *be applied—regardless of the local limit established for that* *pollutant. Also, because any change in prescribed local limits would be a significant program modification, you must notify and seek the approval of the Approval Authority prior to changing the limit in your ordinance.*

Q: Is effluent trading of local limits allowed?

A: Yes. A POTW may decide to negotiate with its IUs in allocating its calculated allowable industrial loadings. However, the POTW needs to ensure that no more than the total MAHL is allocated among domestic/background sources, IUs, commercial sources not considered IUs by the POTW, and other sources of loadings such as hauled waste. Effluent trading may result in a program modification, as defined in 40 CFR 403.18 and results of the trades should be incorporated into any control mechanisms.

Q: If a calculated local limit is excessive (i.e., a large number), should the POTW implement this limit?

A: The POTW should consider the potential IU discharge for the particular pollutant and the possibility that a high limit might encourage increased discharges to the system. Of course, the POTW must receive Approval Authority concurrence on the local limit.

Q: How do I develop local limits for other pollutants (e.g., BTEX compounds, nitrobenzene, , styrene) that may be specific to certain users?

A: For BTEX, some options for developing local limits include:

- *Based on fume toxicity criteria.*
- *Based on aquatic life protection criteria.*
- *Based on treatment technology. The* Model NPDES Permit for Discharges Resulting from the Cleanup of Gasoline Released from Underground Storage Tanks *(EPA, 1989) contains two sets of effluent limits: 1) BTEX of 100 ug/l and benzene of 5 ug/l (assumes approximately 15 mg/l of dissolved product is treated to a removal efficiency of 99.5 percent, which can be achieved with a commercially available stripper unit), and 2) BTEX of 750 ug/l and benzene of 50 ug/l (assumes approximately 15 mg/l of dissolved product is treated to a removal efficiency of 95 percent, using equipment that a small business is more likely to purchase).*
- *Based on worker safety and health criteria. Consult the* Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors *(EPA, 1992)*

Q: How should IU-specific limits be developed for "atypical" (unusual or periodic) dischargers, such as ground water cleanups, hauled waste, landfill leachate, and underground storage tank cleanups containing pollutants for which no local limits or MAHLs are established and which cannot be measured at the headworks?

A: First, you should ensure that your local ordinance gives you the authority to impose limits for pollutants that are not specifically listed in your ordinance limits or other document pertaining to local limits adoption policy. Second, you should review the Supplemental Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program *(EPA-W21-4002, May 1991) and relevant RCRA site remediation guidelines (for underground* *storage tanks and ground water contamination) to see what types and concentrations of pollutants are typically discharged by these wastewater resources. The POTW should then determine (on a site-specific basis) which of these sources are likely to be a problem and establish a monitoring program for the sewer trunk lines into which the wastewater is discharged. If this sampling/monitoring program shows the potential for an adverse impact on the POTW, then specific local limits can be developed and incorporated into the discharge permit of the IU(s) that are problematic. Third, you should consult the* Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors *(EPA, 1992) for additional data relating to health and safety concerns.*

9.6 OVERSIGHT AND PUBLIC PARTICIPATION

Q: What kind of public participation should I expect during the local limits development process?

A: Although it is not usual for the public to become actively involved in the development process, the CWA established public participation as an integral part of developing any regulatory program, including standards and effluent limitations associated with the pretreatment program. Obviously, "public" participation includes all affected entities. The IUs are critically important participants in the whole local limits development process. The General Pretreatment Regulations encourage public participation by requiring public notices or hearings on local limits development. Any subsequent modifications that are deemed significant modifications (as defined in 40 CFR 403.18 (b)) must be publicly noticed. Minor modifications, such as the adoption of a more stringent local limit for a POC, do not require public notice. However, the POTW must ensure that it has the authority to impose more stringent limits. Modifications to local limits for pH and reallocation of the MAIL are considered to be minor program modifications and do not require public notice.

Q: Do I need Approval Authority approval to implement and enforce local limits?

A: No, you do not unless you are amending your limits to make them less stringent than those currently incorporated in your approved pretreatment program. As prescribed in 40 CFR Part 403, the authority to develop and enforce local limits needs to be incorporated into a POTW's permit at the time of program approval. Local government has the ability to amend its ordinance at any time in order to revise the local limits, but any relaxation of local limits without approval would probably constitute a violation of its NPDES permit.

9.7 IMPLEMENTATION AND ENFORCEMENT OF LOCAL LIMITS

Q: Are local limits enforceable if not contained in a sewer use ordinance (SUO)?

A: Local limits are enforceable if included in a valid user permit or similar enforceable control mechanism. From a notification standpoint, local limits may be more difficult to enforce if references to them are not specifically spelled out in the SUO so that IUs know what is expected of them. Even if the limits are not in the SUO, the Control Authority must ensure that it has the legal authority to enforce limits or procedures that are in documents kept separate from the SUO and that all required public participation procedures are conducted. The Control Authority will need to evaluate the availability of resources and the respective burden of enforcing local limits *before deciding whether to use general language about complying with local limits versus putting specific MAIL values in their SUO.*

Q: Can my State or EPA take enforcement action against IUs in my jurisdiction for violations of local limits?

A: All local limits developed in accordance with the provisions stated in 40 CFR 403.5(c) are deemed to be Pretreatment Standards for the purposes of section 307(d) of the CWA, and therefore EPA or the State Approval Authority may take enforcement action against any industrial user for a violation of a local limit. The CWA also provides that affected third parties may bring "citizen suits" against users for violations of these local limits.

Q: How can a POTW justify imposing stringent local limits on IUs when the POTW is not subject to an NPDES permit limit or sludge standards for the same pollutant?

A: If a POTW believes that one or more POCs may cause or have the potential to cause damage to the system infrastructure (i.e., corrosion, erosion, disruption of plant treatment efficiencies), affect worker safety & health, or negatively impact water quality, it can impose local limit for these POCs. The use of site-specific data (rather than less precise"literature" data) for local limits calculations will always produce better, more technically defensible limits. In addition, POTWs have the ability to establish land application of its sludge as the goal of its pretreatment program and impose sludge land application, as opposed to sludge surface disposal, criteria.

Q: Can a POTW allocate local limits to non-categorical SIUs only and require CIUs to comply with the categorical standards only?

A: This is an allocation method issue. As long as the appropriate categorical standards are imposed on the CIUs and the sum of the loadings allocated to all IUs do not exceed the total MAIL, the POTW can assign MAILs as it sees fit (i.e., each IU need not be given the identical limit for a particular POC). Please note that if the POTW establishes a MAIL for a pollutant, then an allocation for CIUs for that pollutant must be given even if the categorical standard does not regulate that pollutant. Also, please note that local limits based on the general prohibitions (e.g. corrosion, flammability etc.) would still need to be applied to categorical industries.

Q: What do I do if the local limits that I developed are below 40 CFR Part 136 achievable minimum detection levels (MDLs)?

A: There are a number of techniques for dealing with pollutants that are present below the minimum detection levels. In some cases, sample can be "spiked" with a known concentration of a specific pollutant and then analyzed. However, in most cases the POTW should review the various approaches discussed in detail in Chapter 5 (Calculation of Maximum Allowable Headworks Loading) of this manual and select the one that is most appropriate for its system.

9.8 POTW OPERATIONS

Q: Our POTW consists of multiple treatment plants. Wastewater flow and sludges can be diverted between them. How does this affect local limits evaluation and development?

A: *To ensure that all treatment plants are protected from pass through, interference, and sludge degradation, each treatment plant should calculate allowable headworks loadings and the MAHL can then be selected from the most stringent of these. This practice will effectively impose a safety factor on all of the treatment plants in the POTW and avoid any disruption of the plant treatment process or violation of the POTW's NPDES discharge permit.*

Q: Is expansion of my POTW's service area cause for me to re-evaluate local limits?

A: *EPA recommends that a POTW evaluate the characteristics of its "new" service area to determine how the POTW's current local limits requirements would be affected. Although not an absolute requirement (due to presumed safety factors built into a POTW's local limits determination), it is always prudent to re-evaluate the local limits calculations if the expansion will add a number of SIUs to the POTW's collection system. The decision about what triggers the need for a re-evaluation is left to the POTW; however, as has been previously recommended, local limits should be re-evaluated periodically whenever there are significant changes in the mix of IUs or in the total daily flow through the system (see Exhibit 7-2).*

Q: How do contract operations or privatization affect local limits evaluations and development?

A: *A POTW's type of management should have no impact on the evaluation and development of local limits. Local limits are designed to protect the POTW from pass through, interference, or degradation of sewage sludge. As long as the public has some fiduciary interest in the POTW the need for local limits should be assessed on a routine basis. If the POTW is completely sold to a private entity, then the 403 regulations no longer apply and the new owner of the treatment plant is not required to develop or implement local limits unless it is made a management practice requirement in its NPDES permit.*

Q: Is it possible to develop local limits for a wastewater treatment lagoon where sludge is dredged only every 20 years?

A: *. The POTW can always develop local limits based on water quality. A lagoon system would not be significantly different than any other type of system in that respect. For sludge, the POTW should ensure that the sludge, when dredged, will meet the standards for its chosen sludge disposal option by establishing local limits protective of that option.*

9.9 POTW USERS

Q: If a new significant industrial user/categorical industrial user (SIU/CIU) commences its process discharge, or an existing SIU/CIU ceases its process discharge, is a local limits re-evaluation necessary?

A: *It depends. If the SIU/CIU contributes a "significant percentage" (as determined by the POTW based on total design flow or number of IUs contributing a particular POC) of the total loading for a particular pollutant or pollutants, then the POTW should recalculate the local limits. However, if the SIU/CIU in question does not have the capability of adversely affecting the entire*

POTW, then (depending upon the allocation method, SUO language, or applicable categorical standards) the local limits can be specified in the IU's discharge permit.

Q: If I have CIUs that have specific, numeric categorical pretreatment standards, is it necessary for me to apply local limits to these CIUs for these pollutants?

A: No, it is not necessary <u>unless</u> the numeric categorical standards for a specific POC covered by local limits are less stringent than the values specified in the local limits. In this case, the more stringent local limits must prevail.

Q: If a daily maximum local limit is less than a monthly average categorical standard, what limit should I apply in an IU permit?

A: The IU permit should include both limits because they are enforced based on different requirements—technical versus technological, , etc. **.** *For example, assume the following limits apply:*
Copper categorical standards = 2 mg/L daily maximum, 1 mg/L monthly average
Local Limit = 0.5 mg/L

The IU permit would have a daily maximum limit of 0.5 mg/L and a monthly average limit of 1 mg/L. The daily maximum would be based on a local limit and the monthly average would be based on categorical standards. There would be two different sets of limits to enforce.

Q: Does promulgation of new categorical pretreatment standards affect local limits evaluation?

A: The promulgation of a new categorical standard should have no effect on local limits requirements. All industrial users subject to the categorical standard(s) will have to meet that discharge standard. However, if the <u>categorical</u> standard for a particular POC is less stringent than the local limit set for that pollutant, the more stringent local limit must be met by the IUs subject to the categorical pretreatment standard. In addition, if the new categorical standard is more stringent than the local limit, the"freed up" loading should be reallocated to the other IUs.

<u>9.10 MISCELLANEOUS</u>

Q: Can local limits evaluation and development be contracted out?

A: EPA believes that the optimum process is for the Control Authority to evaluate and develop the appropriate local limits because it provides the Control Authority with a better understanding of limit development and the importance of compliance. However, recognizing the fact that some Control Authorities may be severely constrained by an overextended workforce, or require access to technical expertise that is not internally available, it may be appropriate for the CA to secure the necessary manpower and expertise through an outside consultant or engineering firm. However, the CA should be aware that any mistakes or improper determinations would be its legal responsibility if the Approval Authority, an IU, or any outside party challenges the POTW on the assignment of the limits.

Q: If a POTW's local limits evaluation indicates that its sludge disposal method (e.g., land application) is the most limiting factor, may the POTW) pursue a less stringent sludge disposal method (e.g., landfill)?

A: The determination of the manner in which the sewage sludge is used or disposed of is a local determination [see 40 CFR 503.6 (c)]. As long as a POTW adheres to all of the regulatory requirements specified in 40 CFR Part 503, it may select the most optimum method of sludge disposal. However, a change in a POTW's sludge disposal and management practices is considered a substantial modification of the POTW's pretreatment program and must be evaluated and approved by the Approval Authority according to the procedures set forth in 40 CFR 403.18. Regardless of how a POTW disposes of sludge, EPA encourages POTWs to consider using land application "clean sludge" values from 40 CFR 503.13 in their calculation of AHLs. Use of these criteria can improve a POTW's opportunities for the beneficial use of sludge, which is one of the goals of the National Pretreatment Program. Moreover, the land application standards have a more extensive list of pollutants than either surface disposal or incineration and would help control discharges of toxic pollutants that these disposal alternatives overlook.